REMEDIAL DESIGN WORK PLAN

Operable Unit 1/Operable Unit 2 Portion of the Anniston PCB Site

Pharmacia LLC/Solutia Inc.

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Geosyntec consultants

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ACRONYMS AND ABBREVIATIONS

ADEM	Alabama Department of Environmental Management
AMA	AMA Environmental Services LLC
AOC	Administrative Order on Consent
AQ	Anchor QEA
ARAR	applicable or relevant and appropriate requirements
ASTM	American Society of Testing Materials
AWQC	Ambient Water Quality Criteria
CD	consent decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfs	cubic feet per second
cy	cubic yards
CFR	Code of Federal Regulations
CQA/QCP	construction quality assurance/quality control plan
EE/CA	engineering evaluation/cost analysis
EM	electromagnetic
EOR	engineer of record
ERP	emergency response plan
FEMA	Federal Emergency Management Administration
FS	feasibility study
FSP	field sampling plan
Geosyntec	Geosyntec Consultants, Inc.
GPR	ground-penetrating radar
GSI	GSI Environmental, Inc.
HDPE	high-density polyethylene
IC	institutional control
ICIAP	institutional controls implementation and assurance plan
IM	interim measure
ISM	incremental sampling method
ITRC	Interstate Technology and Regulatory Council
LiDAR	light detection and ranging

MCL	maximum contaminant level
µg/L	microgram(s) per liter
mg/kg	milligram(s) per kilogram
NAVFAC	Naval Facilities Engineering Systems Command
NPDES	National Pollutant Discharge Elimination System
NRC	National Research Council
NTC	non-time-critical
NTCRA	non-time-critical removal action
O&M	operation and maintenance
OLN	Oxford Lakes Neighborhood
P/S	Pharmacia LLC/Solutia Inc
PCB	polychlorinated biphenyl
PDI	predesign investigation
PDIWP	predesign investigation work plan
PPIN	property identification number
PTW	principal threat waste
QAPP	quality assurance protection plan
QA/QC	quality assurance/quality control
RA	remedial action
RCRA	Resource Conservation and Recovery Act
RD	remedial design
RDWP	Remedial Design Work Plan
RF	radiofrequency
RFI	Resource Conservation and Recovery Act Facility Investigation
RI	remedial investigation
ROD	record of decision
SOP	standard operating procedure
SOW	statement of work
TCRA	time-critical removal action
TODP	transportation and off-site disposal plan
TSCA	Toxic Substance Control Act

TSWP	treatability study work plan
UAS	unmanned aerial system
USACE	United States Army Corp of Engineers
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
UST	underground storage tank
UWDA	unauthorized waste disposal areas

1 INTRODUCTION

This Remedial Design Work Plan (RDWP) has been developed for the Operable Unit 1/Operable Unit 2 (OU-1/OU-2) portion of the Anniston PCB Site (the Site) as shown on Figure 1-1. The RDWP is a deliverable under the OU-1/OU-2 Remedial Design/Remedial Action (RD/RA) Consent Decree (CD: United States Environmental Protection Agency [USEPA] 2021) and was developed on behalf of Pharmacia LLC/Solutia Inc. (P/S). This RDWP presents the approach to complete the RD for the OU-1/OU-2 remedies identified in the CD and is consistent with the respective components of the OU-1/OU-2 Record of Decision (ROD; USEPA 2017). There are components of the OU-1/OU-2 ROD that are not included in the CD that are being performed by other parties.

This RDWP is available as an electronic deliverable at RDWP. Other publicly available technical documents for OU-1/OU-2 and the Site are available at Anniston PCB Site File Exchange.

1.1 Purpose of this Remedial Design Work Plan

This RDWP, which has been prepared as the initial technical deliverable under the CD, provides the process, technical approach, and schedule that will be used to develop the RD. The RDWP is based on technical requirements identified in the CD, including the Statement of Work (SOW) that is included as Appendix B to the CD.

1.2 Remedial Action Summary for OU-1/OU-2

The remedy USEPA selected for OU-1/OU-2 includes multiple components for soil, groundwater, and sediment. The ROD identified seven categories or types of remedies based on the range of remedial alternatives presented in the OU-1/OU-2 Feasibility Study (OU-1/OU-2 FS; Ramboll Environ 2016). The seven categories of remedial alternatives for OU-1/OU-2 identified in the CD and the selected remedy for each category are as follows:

- **Residential soils:** The selected remedy for residential soils is removal and on-site disposal of surface soil with PCB concentrations greater than or equal to 1 milligram per kilogram (mg/kg) and removal and off-site disposal of subsurface soil with PCB concentrations greater than or equal to 10 mg/kg. The selected remedy also includes long-term soil management for (i) properties with residual PCBs greater than or equal to 1 mg/kg, (ii) properties with PCB concentrations in soil greater than or equal to 1 mg/kg that have been designated as "unsuitable for removal," and (iii) properties that potentially have residual PCBs beneath a structure (i.e., a building, shed, or paved area that limits exposure).
- **Special use properties:** For high-activity special use properties, the selected remedy includes removal and on-site disposal of surface soil with PCB concentrations greater than or equal to 1 mg/kg and removal and off-site disposal of subsurface soil with PCB concentrations greater than or equal to 10 mg/kg. For low-activity special use properties, the selected remedy includes removal and on-site disposal of surface soil with PCB concentrations greater than or equal to 1 mg/kg and removal and off-site disposal of subsurface soil with PCB concentrations greater than or equal to 97 mg/kg. The selected remedy also includes long-term soil management for (i) properties where

residual PCBs are greater than or equal to 1 mg/kg, (ii) properties with PCB concentrations in soil greater than or equal to 1 mg/kg that have been designated as "unsuitable for removal," and (iii) properties that potentially have residual PCBs beneath a structure (i.e., a building, shed, or paved area that limits exposure).

- **Interim measure (IM) areas:** The IM component of the OU-1/OU-2 remedy includes expanding previously implemented IMs to provide complete spatial coverage and assessing the potential for principal threat waste (PTW) to be present in portions of OU-1/OU-2 that are located just east of Operable Unit 3 (OU-3). The presence of PTW would be characterized by groundwater with dissolved-phase PCBs at concentrations greater than the State maximum contaminant level (MCL) and the Federal Safe Drinking Water Act MCL. If PTW is found to be present, the specific approach to address the PTW materials will be developed in the RD recognizing the ROD identifies excavation as one potential approach.
- **Dredge spoil piles:** The remedy includes removal and off-site disposal of four dredge spoil piles located near or adjacent to Snow Creek. This selected remedy includes predesign investigation (PDI) sampling for one dredge spoil pile (i.e., SC-2) that was not characterized during the remedial investigation (RI) to assess if PCB concentrations are greater than or equal to the threshold concentration for dredge spoil pile removal in OU-1/OU-2 (i.e., 3 mg/kg). Long-term soil management for areas underlying dredge spoil piles with residual PCBs greater than or equal to 1 mg/kg is also part of the remedy.
- **Nonresidential soils:** For nonresidential soils, the remedy includes removal and off-site disposal of surface soil with PCB concentrations greater than or equal to 21 mg/kg using exposure point concentrations based on the 95% upper confidence limit value for a given exposure unit (EU), removal and off-site disposal for subsurface soil with PCB concentrations greater than or equal to 97 mg/kg, and long-term soil management for residual soil with PCB concentrations greater than or equal to 1 mg/kg. The remedy also includes the removal and off-site disposal of nonresidential soils from several small areas where non-PCB constituents are present at concentrations greater than their respective remedial goals from the OU-1/OU-2 ROD.
- **Soil and groundwater at T-11:** For the T-11 area, the remedy includes removal and off-site disposal of soil from the upper 18-inch horizon across the broader T-11 area and the removal and off-site disposal of soil at depth directly surrounding groundwater well T-11; placement of a low-permeability cap over the broader T-11 area; the extraction, treatment, and discharge of groundwater from new groundwater wells installed in the T-11 area; and land use controls (e.g., deed restrictions or environmental covenant) that prohibit future groundwater use.
- **Sediment and creek bank soils:** For sediment and creek bank soils, the remedy includes stabilization of select creek bank areas and the removal and off-site disposal of sediment with PCB concentrations greater than or equal to 3 mg/kg. The remedy also includes the removal and off-site disposal of several sediment deposits containing

non-PCB constituents at concentrations greater than their respective remedial goals from the OU-1/OU-2 ROD.

Additional details for the remedy selected for each of the categories identified above are provided in Section 2.2 of this RDWP.

1.3 Remedial Design Objectives

This RDWP documents the development of plans and specifications to be used to guide implementation of the USEPA-selected remedy for OU-1/OU-2 (USEPA 2017, 2021). The following activities are necessary to facilitate implementing the OU-1/OU-2 remedy:

- Collect and evaluate PDI data, which is needed to support the RD.
- Develop design submittals (e.g., work plans, PDI reports, design reports, plans, and specifications) to facilitate USEPA approval of the RD.
- Develop engineering drawings and design specifications to support implementation of the selected remedy by a remediation contractor(s).
- Develop a soil management program to work effectively with the 811 "One Call" system as a long-term institutional control (IC) to manage residual PCBs.
- Develop a long-term operation and maintenance (O&M) program to provide an effective remedy following implementation.
- Develop a long-term monitoring program to assess remedy performance over time, including data to support the 5-year review process.

1.4 Remedial Design Team Organization

To complete the wide range of PDI and engineering activities identified in the CD, P/S have assembled an RD team working under the direction of the Supervising Contractor, John R. Loper, PE, BCEE, CSP, President and Principal Engineer of The Loper Group, Inc. Mr. Loper reports directly to the P/S Project Coordinator, Ms. Gayle Macolly, who communicates directly with the USEPA Project Coordinator, Ms. Pamela Scully, PE, who is also USEPA's Remedial Project Manager for the Site.

The RD team includes personnel from several engineering consulting firms that report to Mr. Loper through the Engineer of Record (EOR), Geosyntec Consultants, Inc. (Geosyntec). Other primary members of the RD team from an engineering perspective include Anchor QEA (AQ) and GSI Environmental Inc. (GSI). The respective roles and responsibilities of the primary RD team members are summarized below:

- AQ is responsible for designing sediment remediation for the OU-1/OU-2 reach of Snow Creek and dredge spoil pile SC-8. RD efforts will include developing plans, specifications, and portions of the design reports related to the sediment remedy component. AQ will also lead the PDI for sediment and dredge spoil pile SC-8 given its proximity to Snow Creek.

- GSI is responsible for developing the groundwater remediation design for the T-11 area. This includes developing plans, specifications, and related portions of design reports for extracting, treating, and discharging water from the T-11 area. The PDI efforts for this component of the remedy will include the assessment of potential PTW in the Eastside Properties, including the area where sample PB-RR-37 was collected.
- Geosyntec will be the overall EOR for the OU-1/OU-2 RD and is also responsible for designing the floodplain soil aspects of the OU1/OU-2 remedy. This includes nonresidential and residential soil (including special use properties), IM areas, upland-dredge spoil piles, creek bank areas, and soil removal and low-permeability cap design for the T-11 area. The Geosyntec team will be led by Alan Fowler and supported by Rudy Bonaparte, PhD, PE, as the overall EOR for the OU-1/OU-2 RD.
- There are other supporting team members including Genesis Project, Inc., TEA, Inc., The Loper Group, Inc., and AMA Environmental Services LLC (AMA) that participate in many of the tasks not related to engineering, such as general management support, data management, reporting support, technical support and review, field activity support, oversight support, field sampling and/or the development of long-term monitoring plans.

1.5 Organization of the RDWP and Compliance with SOW Requirements

This RDWP includes eight sections, including this introduction. Background information for OU-1/OU-2 is provided in Section 2, and a wide range of technical activities that will be conducted to support RD development are described in Section 3. The process to develop the design and the associated design deliverables are presented in Section 4, and the process to identify and incorporate applicable or relevant and appropriate requirements (ARARs) into the RD is presented in Section 5. The RD schedule is presented in Section 6, and the preliminary sequence of RD/RA activities is discussed in Section 7. Reference citations for materials cited in this RDWP are presented in Section 8.

The OU-1/OU-2 RD/RA Health and Safety Plan (OU-1/OU-2 RD/RA HASP; P/S 2021a) is included as Appendix A to this RDWP. It has been developed in accordance with the requirements of 29 Code of Federal Regulations (CFR) Sections 1910.120 and 1926.65. The OU-1/OU-2 RD/RA Emergency Response Plan (OU-1/OU-2 RD/RA ERP; P/S 2021b) is included as Appendix B to this RDWP. The ARAR tables from the OU-1/OU-2 ROD (USEPA 2017) are included as Appendix C to this RDWP.

To document compliance with the requirements of the SOW, Table 1-1 presents these requirements and identifies the location in the RDWP where the associated materials are presented.

2 BACKGROUND

The Site includes residential and nonresidential (i.e., commercial/industrial, and public) properties located in and around Anniston, Oxford, Hobson City, and areas of Calhoun and Talladega Counties in Alabama. The Site is divided into OUs. OU-1/OU-2 is a combination of residential and nonresidential properties around Solutia's Anniston Facility (the Facility) and downstream along Snow Creek to Highway 78 (Figure 2-1). Solutia's Anniston Facility and its adjacent closed landfills (i.e., the South Landfill and West End Landfill) comprise OU-3. OU-4 includes Choccolocco Creek and its 100-year floodplain downstream of its confluence with Snow Creek and the portion of Snow Creek downstream of Highway 78 to its confluence with Choccolocco Creek.

2.1 OU-1/OU-2 Description

OU-1/OU-2 consists of both residential and nonresidential properties within the Site that are upstream of Highway 78 up to and surrounding the Facility (OU-3). A small portion of OU-1/OU-2 is located downstream of Highway 78 and east of Snow Creek and was designated by USEPA as the Oxford Lakes Neighborhood (OLN) Zone. This area is also identified as EU30 on Figure 2-2.

2.1.1 Nonresidential Properties within OU-1/OU-2

The lateral study bounds for the nonresidential portions of OU-1/OU-2 were established based on the limits of Snow Creek's 100-year floodplain and drainage areas downstream of the 11th Street Ditch. Snow Creek is a small urban drainage way that flows through Anniston and into Oxford before its confluence with Choccolocco Creek just south of Interstate 20 near the Choccolocco Creek publicly owned treatment works. Two areas outside of the floodplain are also included in OU-1/OU-2—one just southwest of the Facility located near the former landfill operations (identified as EU1 on Figure 2-2) and the OLN Zone shown as EU30 on Figure 2-2. While these two EUs are located outside the 100-year floodplain, they are included in the OU-1/OU-2 study area based on their general proximity to OU-3, OU-1/OU-2, and the documented presence of PCBs, including the results of investigations conducted under the Administrative Order on Consent (AOC; USEPA 2001a). Other nonresidential areas, including the 11th Street Ditch and the West 9th Street Creek (Solutia 2003), that were historically addressed under the AOC are also located within the OU-1/OU-2 study area.

The geographic footprint for the nonresidential investigations was generally guided by the source, release mechanism, and migration pathway for PCBs from OU-3. With PCB-containing materials as the primary source for the off-site migration of PCBs from OU-3, the associated release mechanism was overland surface water runoff during and following periods of heavy precipitation. In the conceptual site model, overland surface water runoff and other discharges transported PCB-containing materials from OU-3 to the 11th Street Ditch. From there, surface water flow along the 11th Street Ditch transported these sediment-bound PCBs downstream along Snow Creek. During periods of high flow, out-of-bank flooding occurred, and PCB-containing materials were transported into the adjoining floodplain areas. This occurred when a portion of the materials suspended in the water column settled onto floodplain soils as surface water velocities decreased to a point where the particles would no longer stay suspended. For the nonresidential

investigations, the lateral extent of significant overbank flooding was conservatively estimated to be the footprint of the 100-year floodplain.

The study area for the nonresidential portions of OU-1/OU-2 was initially presented in the *Field Sampling Plan for the Non-Residential Properties of the Operable Unit 1/Operable Unit 2 Area of the Anniston PCB Site* (BBL 2004) and associated addenda (BBL 2005 and 2006).

The EUs shown on Figure 2-2 were developed during previous Site investigations and risk assessments to segregate OU-1/OU-2 into manageable land units that could reasonably categorize potential exposures for human receptors that access and use these areas. The boundaries of each EU were established based on the following:

- The limits of the drainage areas and 100-year floodplain for Snow Creek
- Natural and man-made physical features that could impact transport patterns (ridges, valleys, elevated highways, bridges, culverts, railroad beds)
- Land use
- Continuity (e.g., if a park is divided by a road or railroad, the entire park would still be grouped into one EU)
- Similarity of location with respect to suspected transport and deposition characteristics (i.e., PCBs transported via surface water are contained in the 100-year floodplain and generally decrease with downstream distance from the Facility)

A series of IMs was previously implemented in different areas of OU-1/OU-2 (i.e., Northside Area, Eastside Area, Eastside Drainage Way, Alabama Power Company Drainage Ditch South, 11th Street Ditch, Hall Street, and Quintard Mall). The general locations of these IM areas are shown on Figure 2-3 recognizing the OU-1/OU-2 ROD only required additional actions (other than long-term O&M) for the Eastside Drainage Way, the Northside Area, and the Eastside Area.

2.1.2 Residential Properties within OU-1/OU-2

Residential properties in OU-1/OU-2 have previously been addressed in accordance with the Time-Critical Removal Order (Removal Order; USEPA 2001a) that was included as Appendix C to the Partial Consent Decree [PCD] [USEPA 2003]), and the Non-Time-Critical Removal Action Agreement (NTCRA Agreement; included as Appendix G to the PCD) that was later clarified by the issuance of a Stipulation and Agreement (Stipulation) between the USEPA and P/S to address the phasing and extent of the cleanup under the NTCRA Agreement (USEPA 2006). Residential properties were identified and characterized in accordance with specific requirements set forth in the PCD (including the Removal Order and the NTCRA Agreement) and the removal actions subsequently implemented. Most of the affected properties have been remediated to PCB concentrations below 1 mg/kg.

2.2 Summary OU-1/OU-2 Remedy Requirements in the Design

The selected remedy for OU-1/OU-2 directly addresses soil, sediment, and groundwater recognizing that actions to address these media (specifically sediment and creek bank soils) will also address surface water, which was identified as a media of concern in the RA objectives that

were used to develop the remedial alternatives evaluated in the OU-1/OU-2 FS. While the OU-1/OU-2 FS and ROD identified eight categories or remedial alternatives/remedies, only seven of the eight were included in the CD. The eighth category, addressing unauthorized waste disposal areas (UWDAs), was not carried forward in the CD between the USEPA and P/S and is being addressed by other parties. Additional details for the seven categories of remedies discussed in Section 1.2 are provided below in Sections 2.2.1 through 2.2.7.

2.2.1 Residential Soil

The removal of soil from residential properties was initiated in 2001 under the Removal Order and continued under the NTCRA Agreement and the Stipulation. An engineering evaluation/cost analysis (EE/CA) was prepared as part of the NTCRA Agreement and documented the most appropriate removal action alternative to be soil removal and disposal from residential properties (Solutia 2003). The NTCRA Approval Memorandum issued by USEPA concurred with the EE/CA findings (USEPA 2004) and identified removal and on-site management of surface soil with PCB concentrations greater than or equal to 1 mg/kg but less than 10 mg/kg. Surface soil (0 to 12 inches below ground surface) or subsurface soil (greater than 12 inches below ground surface) with PCB concentrations greater than or equal to 10 mg/kg required removal and disposal at an appropriate off-site disposal facility.

The residential removal actions for OU-1/OU-2 are essentially complete with removal actions fully completed for 573 of 621 properties (including 8 removals completed by USEPA). Removal actions have not been conducted at the remaining 48 properties. Of these remaining properties, access has not been granted to complete removals for 12 properties, 35 properties are unsuitable for removal due to overgrown vegetation, and 1 property is currently scheduled for a removal action.

Removal actions were conducted if sampling indicated subsurface soil PCB concentrations were at or above 10 mg/kg. Subsurface soil removal was conducted until the PCB concentration was below 10 mg/kg based on composite sampling. The property located at 1520 McDaniel Avenue required an alternative removal response action due to elevated PCB concentrations collected from 10 to 11 feet below ground surface. Based on the proximity of the impacted area to the existing on-site structure, P/S and USEPA agreed to complete a removal to a depth of 3 feet in one portion of the yard and to a depth of 5 feet in an adjacent portion of the same yard area. A geotextile layer was placed at the bottom of the excavation as a marker layer to indicate the depth of the removal prior to backfilling to grade. The details of the actions conducted at 1520 McDaniel Avenue are provided in the *NTC Removal Action Completion Report for Residential Properties in OU-1/OU-2* (Completion Report; Golder 2015).

The components of the selected remedy for residential soils, Alternative RS-2 (Complete the Non-Time-Critical Removal and Manage PCB Residuals), are as follows:

- Follow an approved soil management plan that requires the following:
  - Periodic attempts to gain access to properties identified with PCBs in surface and or subsurface soil
  - PCB cleanup of soil on properties where wooded areas have been cleared and soil is now accessible

    - PCB sampling and cleanup, if needed, of soil below demolished structures (i.e., building, shed, or paved area that limits exposure) on properties where previous cleanups have occurred
- When access is granted or wooded lots are cleared, excavate surface soil with PCB concentrations greater than or equal to 1 mg/kg and subsurface soil with PCB concentrations greater than or equal to 10 mg/kg.
- If surface soil requires removal, sample the interior of homes, and clean any homes with PCB dust concentrations above 1 mg/kg.
- If surface soil requires removal and there is a structure with an accessible crawl space, sample the crawl space and excavate or install barriers when the PCB concentration is greater than or equal to 1 mg/kg.
- Dispose of soil with PCB concentrations less than 10 mg/kg at an on-site soil management area located near the Facility, provided the material passes leachability testing (or dispose of soil at an approved, off-site facility).
- Dispose of soil with PCB concentrations greater than 10 mg/kg at an approved off-site disposal facility.
- Backfill excavated areas with clean soil and topsoil to approximately the same grades that existed prior to excavation.
- Revegetate to stabilize the property as agreed to with the owner.
- Use best efforts to place deed notices on properties to inform purchasers of residual or potential PCB impacts where residual PCBs exceed 1 mg/kg in surface soil or 10 mg/kg in subsurface soil.

Long-term management of PCB residuals (at depth or under structures) associated with residential removals conducted under the Section 122 Administrative Agreement and Order on Consent between USEPA and the Foothills Community Partnership (USEPA 2005b) was included within the scope of the OU-1/OU-2 ROD (USEPA 2017) and CD (USEPA 2021). Long-term management of these PCB residuals (at depth or under structures) will be included in the OU-1/OU-2 RD and will be managed using the same procedures used to manage PCBs residuals associated with residential removal actions conducted under the NTCRA Agreement (USEPA 2006).

2.2.2 Special Use Areas

All the removals required for high-activity special use properties in OU-1/OU-2 have been implemented. There are 13 low-activity special use areas that will be addressed under the OU-1/OU-2 remedy using the following approach:

- When access is granted or wooded lots are cleared, excavate surface soil in low-activity areas with PCB concentrations greater than or equal to 1 mg/kg and subsurface soil with PCB concentrations greater than or equal to 97 mg/kg.

- Clean interior surfaces of occupied structures with dust PCB concentrations above 1 mg/kg.
- Excavate soil or install barriers in accessible crawl spaces with PCB concentrations in surface soil above 1 mg/kg.
- Dispose of excavated soils with PCB concentrations less than 10 mg/kg at an on-site management area located near the Facility (OU-3), provided the material passes leachability testing (or dispose of excavated soils at an approved, off-site facility)
- Dispose of soil with PCB concentrations greater than 10 mg/kg at an appropriate off-site disposal facility.
- Backfill excavated areas with clean soil and topsoil to approximately the same grades that existed prior to excavation.
- Vegetate or revegetate the property to stabilize the surface soil.
- Use best efforts to place deed notices on properties to inform purchasers of residual or potential PCB impacts where residual PCBs exceed 1 mg/kg in surface soil or 10 mg/kg in subsurface soil in high activity areas or 97 mg/kg in the subsurface soil in low activity areas.
- Follow an approved soil management plan that requires the following:
  - Managing subsurface soil for special use properties with PCB concentrations greater than or equal to 1 mg/kg
  - Managing soil below structures for special use properties should the structure be demolished

The remedy for special use properties also includes soil management that will be used to address the 13 properties where PCB residuals might remain beneath structures adjacent to previously remediated areas.

2.2.3 Interim Measure Areas

The remedy selected for the IM areas includes a limited number of geographic expansions for the complete set of IM areas shown on Figure 2-3. These expansions will augment the previous IM work conducted for the Northside Properties area, the Eastside Properties area, and the Eastside Drainageway. The remedy is focused on surface and subsurface soil for these three IM locations and includes the following:

- Excavate surface soil to meet the PCB remedial goal of 21 mg/kg and the non-PCB remedial goals.
- Excavate subsurface soil to meet the PCB remedial goal of 97 mg/kg and the non-PCB remedial goals.
- Dispose of excavated soil in an approved off-site disposal facility based on in-place total PCB concentrations from grab samples.

- Backfill and revegetate as needed to reestablish natural grades and prevent erosion.
- Manage PCB residuals through a soil management program.
- Restrict deed or process environmental easement/covenant to prevent access to groundwater and use of property.

The RD will also include PDI work for soil located in the Northside Properties area, the Eastside Properties area and the Eastside Drainageway area to constrain the remedial footprint and define the thickness of soil removal activities. The PDI work will also address the potential presence of PTW in the Eastside Properties area and a portion of the Eastside Drainageway (located along the north-central border of EU5) that is referred to as the PB-RR-37 area. The PDI work is being conducted in these two areas to assess the potential for groundwater impacts. The ROD specifically identified soil in these areas as having the potential to leach PCBs into underlying groundwater at concentrations exceeding the MCL; therefore, as part of the PDI, further investigation will be conducted to evaluate whether soil in these areas are PTW. If the PDI shows that soil in these areas are PTW, the RD will evaluate a range of remedial approaches to address the soil.

2.2.4 Dredge Spoil Piles

There are four dredge spoil piles located next to Snow Creek (Figure 2-4) that were identified for removal and off-site disposal in the OU-1/OU-2 ROD (USEPA 2017). The remedy for these piles was selected to eliminate the potential for the pile material to erode into Snow Creek over time and includes the following:

- Conduct PDI sampling for one dredge spoil pile (SC-2) to assess PCB concentrations relative to the 3 mg/kg remedial goal identified in the OU-1/OU-2 ROD.
- Excavate soil from up to four dredge spoil piles (pending the PCB results for dredge spoil pile SC-2).
- Excavate soil from beneath the dredge spoil pile footprints as needed to meet the nonresidential soil PCB remedial goal in surface soil (21 mg/kg) and PCB remedial goal in subsurface soil (97 mg/kg).
- If excavation proceeds below the pre-dredge spoil grade, backfill with clean soil and topsoil to approximately the same grades that existed prior to the dredge spoil piles.
- Revegetate backfilled areas.
- Dispose of excavated soil at an approved off-site disposal facility based on in-place total PCB concentrations from grab samples.
- Manage residual PCBs in the dredge spoil pile footprint areas consistent with nonresidential soil areas.

2.2.5 Nonresidential Soils

As discussed in the FS, 11 general locations in OU-1/OU-2 (Figure 2-5) were identified as either not meeting the nonresidential surface soil remedial goal for PCBs or having PCB concentrations greater than or equal to 50 mg/kg (Ramboll Environ 2016). The target remedial areas are located

in EU5, EU7, EU10, EU14N, EU19N, EU19S, EU24, EU26, north of APCO, and a section of the roadway shoulders and median strip along Highway 202 just east of Clydesdale Ave. The selected remedy components for nonresidential soil include excavation and off-site disposal of surface and subsurface soil. The anticipated activities in these select EUs include the following:

- Excavate nonresidential surface soil to meet the PCB remedial goal of 21 mg/kg and the non-PCB remedial goals.
- Excavate nonresidential subsurface soil to meet the PCB remedial goal of 97 mg/kg and the non-PCB remedial goals.
- Dispose of excavated soil in an approved off-site disposal facility based on in-place total PCB concentrations from grab samples.
- Backfill and revegetate as needed to reestablish natural grades and prevent erosion.
- Manage PCB residuals in nonresidential soil.

2.2.6 T-11 Area

The T-11 area has a combination of actions, including extraction, treatment, and discharge of groundwater; removal and off-site disposal of soil; and placement of a low-permeability cap. The remedy for each of the actions is further described in the subsections below.

2.2.6.1 Groundwater

The groundwater remedy for the T-11 area includes installing and operating a pump-and-treat system to capture PCB-impacted groundwater. The long-term goal of this system is to restore groundwater to drinking water standards (i.e., below the PCB MCL of 0.5 micrograms per liter [µg/L]). The system described in the OU-1/OU-2 ROD includes the following elements:

- Two groundwater extraction wells equipped with submersible pumps (possibly operated via solar-powered motors)
- Liquid-phase granular activated carbon and filters, as needed
- Discharge of treated groundwater to Snow Creek via the permit equivalency process for National Pollutant Discharge Elimination System (NPDES)

Additionally, deed restrictions or process environmental easement/covenant restrictions will be put into place to prevent access to groundwater and use of the property.

PDI activities are anticipated as part of the RD to provide additional design basis information regarding (i) hydrogeologic characteristics of the water-bearing unit; (ii) optimal locations for placement of groundwater extraction wells; and (iii) groundwater quality. A summary of the proposed PDIs for the pump-and-treat system are provided in Section 3.1.2.2 recognizing that the full details will subsequently be presented in the Predesign Work Plan (PDIWP).

2.2.6.2 Soil

The selected remedy for soil in the general area around groundwater investigation well T-11 includes excavation and off-site disposal of PTW soil per the ROD (USEPA 2017). Additional activities are anticipated to include the following:

- Excavation of PCB-impacted soil characterized as PTW (approximately 200 cubic yards [cy]) and 18-inches of soil over the broader T-11 area (approximately 4,300 cy)
- Disposal of excavated soil at an approved off-site disposal facility based on in-place total PCB concentrations
- Backfill of excavated areas with clean fill materials and preparation of the surface for low-permeability cap installation (as described in Section 2.2.6.3)

2.2.6.3 Low-Permeability Cap

Following the excavation of soils from the general area around groundwater investigation well T-11, a low-permeability cap consisting of the following materials and layers will be installed per the ROD (USEPA 2017), from bottom to top:

- 40-mil-thick linear low-density polyethylene geomembrane liner (or equivalent) to reduce infiltration
- Geocomposite drainage layer to collect and convey surface water that infiltrates through overlying cover soils
- Minimum 18-inch-thickness of clean backfill and topsoil protective soil cover
- Vegetative cover

2.2.7 Sediment and Creek Banks

The remedies selected by USEPA for Snow Creek sediment within the OU-1/OU-2 footprint and select creek bank areas along Snow Creek are described below and shown on Figures 2-6a through Figure 2-6j.

2.2.7.1 Sediment

As described in the ROD (USEPA 2017), the sediment remedy for OU-1/OU-2 requires excavating contaminated sediment in Snow Creek and disposing of that excavated sediment off-site at an appropriate disposal facility. The remedy will target the removal of sediment to meet the following remedial goal concentrations:

- PCBs: 3 mg/kg
- Barium: 322 mg/kg
- Chromium: 111 mg/kg
- Cobalt: 59 mg/kg
- Lead: 128 mg/kg
- Manganese: 1,100 mg/kg
- Mercury: 1 mg/kg
- Nickel: 46 mg/kg
- Vanadium: 41 mg/kg

Snow Creek is a high-gradient stream that flows through an urbanized corridor of Anniston and Oxford before its confluence with Choccolocco Creek. The steep terrain of the drainage basin produces sharp peak flows within the creek. The time-weighted mean flow rate within Snow Creek increases from approximately 5 cubic feet per second (cfs) at the confluence with the 11th Street Ditch to 28 cfs at the confluence with Choccolocco Creek. The estimated 10-year and 100-year recurrence interval floods for Snow Creek at the point it discharges to Choccolocco Creek are 4,030 cfs and 6,900 cfs, respectively (Federal Emergency Management Agency [FEMA] 1993).

The Snow Creek channel has been substantially modified and channelized (e.g., paved, relocated) in some sections. Between the 11th Street Ditch and the downstream end of the OU-1/OU-2 portion of Snow Creek at Highway 78, there are several bridges and culverts along Snow Creek that will require particular attention during RD and PDI activities and remedial construction, especially at the culverts beneath Highway 202 and potentially within the channelized underground section of Snow Creek beneath the Quintard Mall.

Prior investigations were conducted along Snow Creek to evaluate the nature and extent of PCBs and other constituents in sediment. Sediment data generated during these investigations served as the basis for evaluating the remedial alternatives presented in the OU-1/OU-2 FS (Ramboll Environ 2016). Most of the sediment samples and geomorphological information for Snow Creek were collected in 1999 as part of the Off-Site Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) program (BBL 1999). The geomorphological information included a detailed mapping of sediment deposits, including their locations, dimensions, and material types based on visual observations and geomorphological characterization (e.g., channel deposit, aggrading bar, bank deposit, terrace deposit, sand bar). The creek-mapping results, which showed that some portions of the creek bed had no sediment due to localized high surface water velocity conditions, were used to develop the sampling strategy to characterize the Snow Creek sediment deposits for the Off-Site RFI. Additional sediment sampling in the OU-1/OU-2 portion of Snow Creek was conducted to support the OU-1/OU-2 RI under the Nonresidential Properties Field Sampling Plan (BBL 2004) and associated addenda. This additional sampling generated data to evaluate the potential presence of a wider list of constituents in areas covering the range of PCB concentrations present in Snow Creek. This additional sampling also confirmed the general distribution of PCBs in the OU-1/OU-2 portion of the creek.

As with soil and other Site media, the primary constituent of concern in sediment is PCB. Sediment was also evaluated for other constituents. The existing sediment sampling data indicate that the highest total PCB concentrations (60 mg/kg) in Snow Creek sediment are generally found in sediment from the upstream portions of the creek between the 11th Street Ditch and Highway 202, including the culverts that convey flow under the highway. The data also indicate that there is a small portion of Snow Creek with a mean sediment PCB concentration of 12 mg/kg for sediment deposits near a railroad bridge located just downstream of Highway 202. The sediment in the portion of Snow Creek between the railroad bridge and Highway 78 had an average PCB concentration of approximately 1.9 mg/kg.

Based on concentrations of non-PCB constituents being higher than the remedial goals, the OU-1/OU-2 FS identified two other sediment deposits as candidate remedial areas. One sediment deposit contained manganese above the remedial goal, and another sediment deposit contained chromium, lead, manganese, and nickel above the remedial goals.

The data for the sediment sampling were reported in the *Off-Site RCRA Facility Investigation Report* (BBL 2000) and the *Preliminary Site Characterization Summary Report for OU-1/OU-2* (Arcadis BBL 2007). The data were also summarized in the OU-1/OU-2 RI (ENVIRON 2015) and the OU-1/OU-2 FS (Ramboll Environ 2016).

As summarized in the OU-1/OU-2 FS, approximately 2,500 cy of sediment were identified within the OU-1/OU-2 portion of Snow Creek above the remedial goals established in the ROD. A PDI (as described in Section 3.2.3) will be conducted to document any changes to the locations and dimensions of the sediment deposits within the OU-1/OU-2 portion of Snow Creek and to collect and characterize additional sediment samples to refine the target remedial areas and volumes to support the RD.

2.2.7.2 Creek Banks

As described in the ROD (USEPA 2017), 1,400 linear feet of Snow Creek bank have been identified for stabilization. This includes 350 linear feet that have been targeted for engineered approaches (e.g., riprap, reinforced mats, and sheet piling) and 1,050 linear feet that have been targeted for naturalized bank stabilization using a range of potential techniques (e.g., not maintaining a riparian buffer zone and limiting shoreline access and live planting or repurposing of felled trees, cut brush, or root balls). The creek bank stabilization RD will include PDI efforts to develop appropriate stabilization measures for select bank areas while not impacting local infrastructure. Specific details for conducting the creek bank stabilization PDIs will be presented in the PDIWP. The field sampling plan (FSP) will be a component of the PDIWP and will identify the media to be sampled, as well as the number of samples, specific locations, and depth increments. The FSP component of the PDIWP will also identify the constituents to be analyzed with details on sampling and analysis protocols provided in the accompanying quality assurance project plan (QAPP) that will be an attachment to the PDIWP.

2.3 OU-1/OU-2 Remedy Requirements Not Included in the Design

As noted in Section 2.1, the CD does not require the RD to address the two UWDAs identified in the OU-1/OU-2 ROD and a related property with a property identification number (PPIN) of 32695. The RD is also not required to address nonresidential soils for two parcels based on the presence of chromium. These two properties are identified as PPIN 67095 and PPIN 67096 and are associated with a manufacturing facility that has historically used chromium as part of their operations.

The OU-1/OU-2 ROD does not require P/S to clear residential or special use properties that have been identified as unsuitable for removal. The remedial obligation for these properties continues to exist until such time that vegetation is cleared from a property that would allow the residential removal action or special use property remediation to proceed. While the remedial obligation remains until the properties are cleared, the soil management program will provide for proper controls in the interim such that intrusive activities on the properties, should they be required, do not result in the spread of PCB-containing soils.

3 DESIGN SUPPORT ACTIVITIES

This section of the RDWP presents the range of field, laboratory, and desktop support activities that will be conducted to support the RD. All these activities are critical to developing an RD that is protective of human health and the environment over the long term and will receive regulatory approval. They include a PDI with multiple efforts across media, the associated PDIWP and PDI report, and the potential for treatability studies. Other RD support efforts include developing FSP-related details for inclusion in the PDIWP, developing a QAPP to accompany the PDIWP as an attachment, and evaluating potential off-site disposal options for soil and sediment removed as part of the RA.

3.1 Predesign Investigation Work Plan

There are multiple planned PDI efforts that will be presented in the PDIWP. The PDI is anticipated to include investigations to refine remedial footprints and removal volumes and to assess whether additional remediation is needed (e.g., the PTW areas). The preliminary-planned PDI efforts presented in this section are grouped by media (soil, groundwater, and sediment). While seven categories of RAs are identified in the CD and summarized in Section 2.2 of this RDWP, the affected media in the seven categories can be broadly grouped into soil, groundwater, and sediment. These three media also align with the engineering design responsibilities under the overarching design responsibility umbrella of the EOR. Preliminary PDI efforts that apply more broadly to the RD are also presented in this section and include surveys for local aboveground and underground utilities, base mapping to support development of engineering drawings, and structural integrity surveys to assess infrastructure features (e.g., large culverts) near planned RA work locations.

The preliminary PDI efforts described below will be refined and presented in more detail in the PDIWP that will be submitted 60 days after USEPA approval of the RDWP.

3.1.1 Floodplain and Creek Bank Soil

The PDI will include floodplain soil investigations to confirm the remedial footprints for the residential soil, low-activity special use areas, IM areas, dredge spoil pile SC-2, nonresidential soil, and creek bank soil. For residential areas (if needed) and low-activity special use areas, PDI soil will be sampled based on the requirements of the NTCRA Agreement and Stipulation, respectively. As part of developing the PDIWP, the existing data for the residential and low-activity special use areas will be reviewed to confirm the remedial footprints and removal depths for surface and subsurface soil. If a low-activity area transitions to become a high-activity property, the results for depth sampling generated during the PDI or during previous sampling events will be reviewed against the remedial goals for high-activity properties (i.e., 1 mg/kg for surface soil and 10 mg/kg for subsurface soil) consistent with the Stipulation.

The PDI efforts for soil associated with IM areas are segmented into two groups: the assessment of the IM identified in the OU-1/OU-2 ROD and the evaluation of PTW for the Eastside Properties area and PB-RR-37 (Section 3.1.2.1). The PDI efforts to evaluate the IM enhancement will include confirming the footprints and assessing the conditions at depth within the footprints and removal

depths relative to the PCB remedial goals for surface soil (21 mg/kg) and the subsurface remedial goal of 97 mg/kg.

PDI efforts for the dredge spoil piles are focused on SC-2 to evaluate PCB concentrations relative to the remedial goal of 3 mg/kg.

PDI efforts for the nonresidential areas will include sampling surface soil (0–1-foot interval) around the outside of the remedial footprint identified in the OU-1/OU-2 ROD to confirm the footprint. Consistent with paragraph 10.f. of the CD, sampling of nonresidential properties is limited to the footprint of EUs shown on Figure 2-2. The results of this sampling will be compared to the applicable remedial goal of 21 mg/kg for PCBs. The PDI for subsurface nonresidential soil will include sampling and analysis for comparison with the subsurface remedial goal of 97 mg/kg.

The PDI may also include advancing soil borings and collecting soil samples from the T-11 area for geotechnical characterization to support the engineering design aspects of the low-permeability cap. These activities could include soil borings and soil samples for geotechnical characterization at select creek bank areas to assess a range of creek bank stabilization options. The number and locations of borings and the specific geotechnical testing protocols will be presented in the PDIWP. The PDI efforts for the creek banks may also include hydraulic modeling to assess the potential impacts of hardening creek bank areas. Specific details for the floodplain and creek bank soil PDIs will be presented in the PDIWP and its accompanying QAPP, along with an assessment of whether hydraulic modeling will be needed as part of the RD.

3.1.2 Groundwater

As part of the PDI for OU-1/OU-2, the following groundwater-related conditions will be assessed:

- PCBs potentially leaching from soil to groundwater at the Eastside Properties and the PB-RR-37 area will be assessed through the following:
  - Installing a monitoring well and sampling and testing groundwater for PCBs at the Eastside Properties
  - Conducting confirmation soil sampling to establish a representative PCB soil concentration at the PB-RR-37 area
- Hydrogeologic conditions and groundwater quality in the T-11 area will be assessed through the following:
  - Redeveloping well T-11
  - Installing temporary observation wells near well T-11
  - Collecting hydrogeologic and geotechnical data
  - Sampling and testing groundwater
  - Testing the aquifer

Details of these proposed PDI activities for each area are provided below.

3.1.2.1 Soil-Leaching Assessment at the Eastside Properties and PB-RR-37 Area

At the Eastside Properties (Figure 3-1), an assessment of PCB leaching from soil to groundwater will be conducted to evaluate whether high-concentration soil in this area is resulting in dissolved-phase PCB concentrations in groundwater that exceed the PCB MCL of 0.5 µg/L. The groundwater conditions will be assessed by installing a groundwater monitoring well, developing the monitoring well to remove fine sediment to the extent possible, collecting a groundwater sample, and analyzing the groundwater sample for total PCBs using Aroclor and the sum of PCB homologs. Consideration will also be given in the PDIWP for the potential use of passive sampling methods to obtain representative dissolved-phase PCB measurements for groundwater samples as described by the United States Geological Survey (Imbrigiotta and Harte 2020). The new groundwater monitoring well will be installed in the Eastside Properties area (Figure 3-2). A key consideration that will be evaluated in the PDIWP is locating the groundwater well in an area with low or no PCB impacts in shallow soil. By choosing an area with low or no PCB impacts to soil, the potential to drag-down PCBs from soil to groundwater during well installation is minimized. Other considerations will include locating the groundwater well close to and downgradient of areas within the Eastside Properties where soil has high PCB concentrations.

Details on monitoring well construction and groundwater sampling will be specified in the PDIWP and its accompanying QAPP. The work will be conducted using the Alabama Department of Environmental Management (ADEM) *Alabama Environmental Investigation and Remediation Guidance* (ADEM 2017), the USEPA *Design and Installation of Monitoring Wells Guidance* (USEPA 2013), and site-specific standard operating procedures (SOPs) for the Anniston PCB Site.

The general approach for the PDI activities for the PB-RR-37 area (Figure 3-1) includes a gated process that will be expanded upon in the PDIWP. The first part of this process would include collecting and analyzing additional soil samples to more completely characterize PCB concentrations. The existing PCB results for this area are variable with the sample collected at PB-RR-37 from a depth increment of 0–3 inches having a reported PCB concentration of 3,700 mg/kg and nearby sample collected at PB-RR-40 from a depth increment of 0–3 inches having a reported PCB concentration of 2.3 mg/kg. The initial PDI soil sample results will be used to assess whether the reported sample result of 3,700 mg/kg is an anomaly. Once additional soil samples are collected and the PCB concentrations at PB-RR-37 are characterized, the need for any additional activities will be assessed.

The conceptual approach described above will be refined in the PDIWP and may include installing a groundwater well at this location (PB-RR-37) if representative PCB results from any sample depth are greater than 500 mg/kg. As noted above, the representative soil PCB concentration for assessing PCBs in soil leaching to groundwater will be fully developed and presented in the PDIWP. In developing the sampling approach, consideration may be given to multiple approaches, including discrete sampling and the incremental sampling method (ISM) as described by the Interstate Technology and Regulatory Council (ITRC; 2012, 2020).

3.1.2.2 Hydrogeologic Assessment at the T-11 Area

A range of PDI activities will be considered for the T-11 area (Figure 3-3) to supplement the currently available soil and groundwater data. Any supplemental information may be used to support the design of the proposed groundwater pump-and-treat system. The general type of PDI activities could include the following:

- **Redevelopment of well T-11**: This well was last sampled nearly 10 years ago (November 29, 2012), and redevelopment would likely be necessary to reduce the possibility of suspended sediment being present in groundwater samples.
- **Collection of and analysis of groundwater samples from well T-11**: Groundwater samples may be collected from well T-11 for analysis of PCBs and geochemical parameters. PCB analysis results would aid in establishing current/baseline groundwater conditions and potential pump-and-treat system contaminant loading. Geochemical parameters results would aid in evaluating requirements for auxiliary components for the pump-and-treat system.
- **Slug testing at well T-11**: Slug testing may be conducted at well T-11 to verify the hydraulic conductivity for the well of 5.93 feet per day that was reported in the OU-1/OU-2 RI (ENVIRON 2015). Slug testing may include up to three rising-head and three falling-head slug tests using an appropriately sized slug. Data from these tests, if conducted, would be analyzed with a commercially available software package (e.g., AQTESOLV) to derive a representative hydraulic conductivity at this well. The hydraulic conductivity estimated from slug testing may be used to evaluate the placement of the temporary observation wells.
- **Installation of temporary shallow observation wells**: Temporary shallow observation wells may be installed in the T-11 area via direct-push drilling or other appropriate drilling method for groundwater extraction well screen sizing and the design of well filter packs, as well as supporting the design of the low-permeability cap; improving the groundwater flow characterization in the close vicinity of T-11; and observing water level drawdown and recovery during aquifer pump testing. Well installation would be supervised by a Professional Geologist licensed in the state of Alabama. Well and screen depths would be based on the actual soil characteristics observed during drilling. All borings would be logged according to the Unified Soil Classification System (USCS).
- **Aquifer pumping tests at well T-11**: Aquifer pumping tests at well T-11 may be used to evaluate aquifer response and well yield for design of the groundwater extraction wells and carbon filtration system sizing. Aquifer testing may include constant-rate, step-drawdown, and recovery tests at well T-11, with the two new temporary observation wells used to evaluate groundwater level response to various pumping rates. Data from the test(s) would be analyzed with a commercially available software package (e.g., AQTESOLV) to derive appropriate aquifer properties and evaluate well performance.

The specific PDI activities selected to evaluate hydrogeologic conditions at T-11 will be described in the PDIWP and accompanying QAPP. These activities will focus on data gaps that need to be filled to design the groundwater extraction and treatment system.

3.1.3 Snow Creek Sediment

Existing Site sediment data are presented in the Off-Site RFI Report (BBL 2000). The data collected during the 1999 investigation include physical creek data (e.g., width, water depth),

sediment texture and geographic strata, and sediment cores from which sediment samples were taken and submitted for laboratory analysis. Discernible sediment deposits were mapped and measured throughout Snow Creek. The samples segmented from the cores were submitted for analyses of PCBs, total organic carbon, and grain-size. A subset of the samples was submitted for metals analysis, including arsenic, barium, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, and vanadium. A total of 73 sediment samples collected from 34 locations were analyzed from within the OU-1/OU-2 portions of the creek.

The Snow Creek PDI effort will use a phased approach to evaluate sediment that has deposited in the creek since the prior work conducted in 1999. The goal of using a phased program is to streamline efforts such that areas with sediment that are known to have PCB greater than or equal to 3 mg/kg do not need to be sampled again. The specifics of the PDI activities, including the phased approach, will be presented in the PDIWP.

The PDI objectives, locations, analytical testing, and protocols will be described in a PDIWP and QAPP. Results from these efforts will be summarized in the PDI Evaluation Report.

3.1.4 Utility Surveys

The presence of above-ground and underground utilities in the OU-1/OU-2 areas could pose risks during excavation to both the integrity of the utility and the safety of the workers. During the PDI, active outreach will be completed with property owners, local city building departments, area utility companies (including 811), and county and state transportation agencies regarding the presence of utilities that could impact remedy implementation, worker safety, and/or utility integrity. Utility organizations that would typically be contacted as part of the outreach process include sewer, water, gas, electric, oil, and cable/fiber optic.

Geophysical surveys will be conducted over upland soil excavation areas using the following geophysical techniques to locate subsurface features and utilities:

- **Ground-penetrating radar (GPR) system**: The GPR instrumentation emits pulses of high-frequency electromagnetic (EM) waves into the subsurface. The EM waves either dissipate or are reflected back to the GPR sensor based on contact with subsurface features (e.g., a metal pipe will reflect energy back to sensor). The GPR profiles obtained during the survey will provide cross-sectional subsurface information that can be reviewed in real time. Underground storage tanks (USTs) and buried pipelines typically exhibit anomalous responses that have characteristic GPR signatures (i.e., hyperbola or inverted "U"). From the cross-sectional subsurface information, the size, orientation, and approximate depth of the identified anomalies can be estimated. GPR survey resolution is anticipated to be a minimum of 0.3 feet.
- **Radiofrequency (RF) instrument**: RF instrumentation is capable of tracing active electric lines, telecommunication lines, and other buried lines that may have an induced charge. RF instrumentation is connected directly or through inductive coupling at a point that allows the entirety of the utility line to be traced by introducing a small current and measuring these signals at remote locations. Strong response peaks are observed directly over the lines by an RF sensor.

- **Electromagnetic (EM) unit**: EM instrumentation induces a current by applying magnetic fields into the subsurface and measuring the resulting response. EM is highly sensitive to buried metal features, such as USTs, rebar, and buried pipelines within the upper 3.5 feet of the subsurface, which is the typical burial depth of underground utilities.

The data and information obtained from this work element will be integrated into the Preliminary (30%) RD submittal as existing conditions to allow the RD to be implemented such that contractors can safely manage removal activities around potentially active utilities.

3.1.5 Structural Evaluations

Snow Creek passes through two large structures, specifically at Highway 202 and under Quintard Mall. These structures and others structures adjacent to the potential remedial areas will be evaluated during the PDI to evaluate whether special considerations will be required during remedial construction due to the presence of the structures. An example structure is the 10th Street Bridge over Snow Creek that might present geotechnical slope stability concerns and/or structural concerns. During the PDI activities, field data of the locations, dimensions, construction material types, and condition of structures adjacent to the target remedial areas will be collected for evaluation during the RD. In addition, existing drawings for the structures will be retrieved from the owner, if available, for evaluation during the RD.

3.1.6 Base Mapping Activities

Data regarding the current topography of OU-1/OU-2, including creek bank elevations and structures (e.g., bridges, culverts, and outfalls), are needed to create a survey-level base map for the OU-1/OU-2 RD. The survey methods discussed below have been selected for the PDI based on their ability to generate data for use in the RD and their applicability during the RA phase. Light detection and ranging (LiDAR) will be the primary survey method and will be supplemented with manual survey methods to obtain structure elevations.

LiDAR methods use an unmanned aerial system (UAS) equipped with a laser that emits pulses of light to the ground surface that reflect back to the UAS to measure distance to the ground surface or structures. UAS equipped with a LiDAR sensor capable of measuring a minimum of 40 points per square meter with minimum relative accuracies of 1-4 centimeters will be flown over OU-1/OU-2 to conduct a topographic survey. Data will be collected and processed in conformance with United States Geologic Survey's LiDAR Base Specification Version 1.3. A point cloud will be generated, allowing for feature extraction and terrain modeling, and a bare earth terrain surface will be delivered as a digital terrain model. In addition to the LiDAR survey, additional UAS technologies (i.e., video or photogrammetry) may be used to meet the inspection and long-term monitoring needs during construction. The LiDAR survey will be completed ideally during leaf-off conditions (i.e., winter) to obtain maximum coverage of OU-1/OU-2, and traditional survey work may also be required for locations where UAS operations cannot provide sufficient LiDAR coverage. The UAS work will require a permit from the City of Oxford due to local ordinances and will, at a minimum, require outreach and coordination with the City of Anniston and Calhoun County.

Survey data for structures located in OU-1/OU-2 will be collected manually by a professional land-based surveyor. The structural survey will include locations and elevations of abutments, beams, pipe inverts, and any other details for bridges, tide gates, outfalls, and culverts located in or next to OU-1/OU-2 active remediation areas.

3.1.7 Field Sampling Plan for Predesign Investigations

To provide the details necessary to guide field sampling conducted under the PDIs, FSP-related details will be provided as a component of the PDIWP that will be submitted to USEPA for review and approval. The FSP details included in the PDIWP will be developed in accordance with *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (USEPA 1988) and will address specific field and sample collection activities. If treatability studies are conducted, FSP details will be developed for inclusion in the treatability study work plan (TSWP), and the QAPP may be amended if additional field or laboratory SOPs are developed.

3.2 Predesign Investigation Evaluation Report

In accordance with the SOW, once the PDI activities are completed, a PDI Evaluation Report will be prepared and submitted. The PDI Evaluation Report will include the following information required by the SOW:

- Summary of the PDI activities performed
- Summary of the PDI results
- Summary of the validated data in tabular format and graphic presentation
- Data validation reports and laboratory data reports
- Narrative interpretation of data and results
- Results of statistical and modeling analyses (as applicable)
- Photographs documenting the work conducted
- Conclusions and recommendations applicable to the RD, including design parameters and criteria

The information and data collected during the PDI will be evaluated and the implications for the RD will be presented and discussed in the PDI Evaluation Report.

3.3 Treatability Studies

The option of conducting treatability testing for groundwater that will be extracted and treated as part of the remedy at T-11 will be evaluated during development of the PDIWP based on the potential for groundwater at T-11 to be similar to groundwater being extracted and treated as part of the OU-3 remedy. Significant experience has been gained through treating groundwater extracted from the OU-3 portion of the Site, and this experience will be applied to the RD for the T-11 area. This evaluation will include reviewing the available groundwater treatment information from OU-3 and the historical groundwater data from well T-11 to assess if groundwater treatability studies are needed to complete this RD. If deemed necessary, a TSWP for groundwater treatment will be developed and submitted to USEPA for review.

It is anticipated that dredged sediment will be dewatered and, if necessary, amended with a stabilization agent before final transport and disposal. Treatability studies may be performed, as needed, to optimize the design of sediment dewatering, water treatment, and material stabilization. Laboratory treatability tests may be conducted to evaluate sediment characteristics affecting dewatering techniques (e.g., gravity drainage, solidification with reagents) and the need to stabilize sediment for transport and disposal. Additives (e.g., Portland cement, calciment, lime, and water sorbents) can be used to stabilize the sediment for transport by increasing the shear strength and as a drying agent to stabilize the dredged material by absorbing water, which decreases the sediment water content.

3.4 Quality Assurance Project Plan

The objective of a QAPP is to help ensure the generation of scientifically valid analytical data. A QAPP will be developed that details the sampling and analytical methods that will be used during field and laboratory investigations associated with implementing the PDIWP and TSWP. The QAPP will also describe required sampling and laboratory quality assurance/quality control (QA/QC) programs. The sampling QA/QC program combines USEPA-approved sampling, preservation, and field monitoring techniques with the necessary documentation and chain-of-custody requirements. The sampling QA/QC program also specifies the field QA/QC samples to be collected. The laboratory QA/QC program provides a systematic set of standards of operation and surveillance procedures. The QAPP will include the procedures listed in Section 6.7(d) of the SOW. Task-specific QAPP documents will be updated and submitted as details of the field and laboratory investigations are further developed for all sampling (treatability study, PDI, design, compliance, and monitoring).

The QAPP will follow applicable USEPA guidance, including *EPA Requirements for Quality Assurance Project Plans* (USEPA 2001b), *Guidance for Quality Assurance Project Plans* (USEPA 2002), and *Uniform Federal Policy for Quality Assurance Project Plans* (USEPA 2005a). The QAPP will augment the FSP details included in the PDIWP and TSWP and address the sample collection, handling, laboratory analysis, and data handling presented in the PDIWP and TSWP. The QAPP will be submitted with the PDIWP, and addenda to the QAPP will be submitted for other RD/RA activities as needed.

3.5 Disposal Site Evaluation

An evaluation of potential disposal sites will be developed to support the RD. This desktop evaluation will consider a range of potential off-site disposal options for nonresidential soil and sediment. The evaluation will also consider on-site and off-site disposal options for soil generated during removal activities conducted for residential and special use properties. Key factors to be considered during the evaluation will include costs for transportation and disposal, implications and costs for long-term O&M, and the elements of green and sustainable remediation.

3.6 Property Access Evaluation

P/S are required to use best efforts to secure enforceable agreements from third parties to conduct the work identified in the CD. Properties for which access or use restriction agreements may be required will be identified as part of the PDI. These agreements may include grants allowing P/S and USEPA to access “Non-Settling Owner’s Affected Property” (as defined by the RD/RA CD)

and/or may require a Non-Settling Owner to agree to limitations on the use of Non-Settling Owner's Affected Property and to agree to refrain from interfering with or adversely affecting the implementation, integrity, or protectiveness of the RA. Cover letters and forms of the access agreement and the use restriction agreement will be included in the PDIWP.

The access agreements may also include a request to allow P/S to conduct the PDI (including sampling and surveying), RA activities (including soil/sediment removal and backfill, material staging, and support activities), monitoring of completed RAs, and ingress and egress on the affected property. Use restriction agreements may include restrictions on the use of groundwater for potable or other purposes and restrictions on soil-disturbance activities.

Once the properties that will need to be accessed are identified, the process to obtain the access and use restriction agreements required by the RD/RA CD will include the following steps:

1. The current owner of record of each Non-Settling Owner Affected Property will be identified through Calhoun County, Alabama's available on-line mapping portal (see https://gis.calhouncounty.org/Parcelviewer2/).
2. P/S will transmit a letter and access agreement or use restriction agreement or both to the current owner of record.
3. If the access agreement or use restriction agreement is not returned to P/S within 30 days from the date of delivery, a follow up letter will be transmitted to the owner of record requesting a meeting to discuss the request for the access agreement or the use restriction agreement or both.
4. If a meeting is not scheduled within 30 days of the date of delivery of the follow up letter or if following a meeting with P/S, a Non-Settling Owner refuses to provide access or use restrictions, then P/S will provide a copy of all correspondence to USEPA for further action.

4 REMEDIAL DESIGN ACTIVITIES

The process to develop the RD is presented in this section, including an overview of the technical activities and evaluations that will be conducted to develop the RD deliverables for USEPA review and approval. The RD deliverables include the traditional 30%, 95%, and 100% design deliverables and a wide range of supporting documents. The 60% design phase deliverable was not included in the SOW as the intent is to develop a Preliminary (30%) RD based on the PDI results that can be advanced after USEPA review and input directly to the Pre-final (95%) RD stage.

4.1 Remedial Design Process for OU-1/OU-2 Components

The RD will be developed as a single unified package to address the seven remedy categories identified in the CD through actions for soil, groundwater, and sediment. The final set of engineering drawings and specifications assembled to implement the project will also be a unified single package. The design process is flexible enough to accommodate the development of separate design packages should the results of the PDI or other information support that need. For example, if PDI work conducted for the channelized portion of Snow Creek under Quintard Mall results in a different technical approach or schedule than is being used for the upstream portion of Snow Creek, that portion of the RD could potentially be broken into a separate package.

The RD process also recognizes that actions consistent with the requirements of the ROD or actions similar to those identified in the ROD may have been implemented since the ROD was issued in November 2017. These actions could be associated with an unsuitable residential property where the vegetation was removed or actions that were conducted for an IM area for soil management purposes. Previously implemented post-ROD actions will be documented in the RD and evaluated to determine if additional actions are necessary to bring the post-ROD work into compliance with the requirements of the ROD.

4.1.1 Floodplain and Creek Bank Soil

The approach to developing the design for OU-1/OU-2 soil is presented in the subsections below and is consistent with the selected remedies described in Section 2.2. The primary focus of the design discussions presented below include excavation, creek bank stabilization, and the low-permeability cap for the T-11 area. While most of the RAs discussed below include the disposal of soil or sediment as part of the design, the options are largely limited to off-site disposal at an approved facility. The only exceptions include residential and special use soil that have an option for disposal at an on-site soil management facility that has already been constructed. Another element common to the RD for soil is the soil management plan component of the long-term O&M program. The soil management plan is designed to manage PCB residuals in the event that intrusive activities are conducted in areas containing residual PCBs. Intrusive activities that disturb soil will be controlled using approaches consistent with the *Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Area (*Alabama Soil and Water Conservation Committee 2018).

Consistent with the requirements of the CD, lists for Affected Properties will be developed in the RD for (i) certain residential properties where no additional remediation is required (CD Section 10. b.); (ii) certain residential, special use, and nonresidential properties requiring soil management for PCB residuals (CD Section 10. c.); and (iii) residential and special use properties identified as unsuitable for removal (CD Section 10. d.).

4.1.1.1 Removal and Disposal of Residential Soil

The design of the residential removal is consistent with the Non-Time-Critical (NTC) program. The key RD elements will be developing an efficient process for obtaining access to properties where it has historically been denied and/or the property that is in State receivership. The RD will evaluate whether an existing on-site soil management facility (i.e., the South Staging and Soil Management Area) will be used for disposal purposes or if the soils will be transported to an off-site facility for disposal. The soil management plan will also be an important part of the RD for residential soils.

4.1.1.2 Removal and Disposal of Special Use Soil

The RD for the low-activity special use areas is based on the requirements of the OU-1/OU-2 ROD recognizing that special use areas deemed unsuitable for removal will not require remediation until cleared by the property owner. The RD will focus on surface soil areas that have already been delineated. The results of PDI efforts will focus on subsurface soil based on a remedial goal for PCB concentrations less than 97 mg/kg. The RD will also identify the disposal approach in terms of off-site versus on-site recognizing that subsurface soils from low-activity areas would require disposal at an off-site facility.

4.1.1.3 Removal and Off-Site Disposal of Soil from Interim Measure Areas

The RD will address a limited number of geographic expansions for three of the IM areas shown on Figure 2-3. These expansions will augment previous IM work conducted for the Northside Properties area, the Eastside Properties area, and the Eastside Drainageway. The PDI will focus on the perimeter areas surrounding the remedial footprints identified in the OU-1/OU-2 ROD as well as whether any subsurface soil needs to be removed. The PDI results will be used to identify excavation areas and depths in the RD. The design will also include the selection of backfill materials and vegetation to stabilize the area following construction.

Consistent with the requirements presented in Section 1.3 of the SOW, a design evaluation will be conducted as part of the RD for a portion of the Eastside Drainageway adjacent to the former Miller property. The evaluation will consider potential impacts on the community and railway, and the soil removal volumes for the evaluation will be based on the PDI sampling results.

The results of the PDI-related work conducted to address the potential for PTW in the Eastside Properties area and the PB-RR-37 area will be evaluated as part of the groundwater RD.

4.1.1.4 Removal and Off-Site Disposal of Dredge Spoil Piles

The RD will address the removal of up to four dredge spoil piles (Figure 2-4). Three of the dredge spoil piles are being addressed with floodplain soil (SC-1, SC-2 and SC-7), and dredge spoil pile SC-8 is being addressed along with sediment because it is partially located within the creek bed. One dredge spoil pile (i.e., SC-2) requires PDI results to determine whether removal will be required; therefore, dredge spoil pile SC-2 will be sampled during the PDI. Two of the remaining

three dredge spoil piles (SC-1 and SC-7) will be designed as soil removals, and as noted above, dredge spoil pile SC-8 will be part of the sediment removal design given it is located directly at the edge of Snow Creek. The process to sample soil beneath and around the dredge spoil piles will be presented in the PDIWP.

4.1.1.5 Removal and Off-Site Disposal of Nonresidential Soil

There are 11 general locations in OU-1/OU-2 with nonresidential soils targeted for removal and off-site disposal (Figure 2-5). The outside perimeters of the target excavation areas identified in the OU-1/OU-2 ROD will be confirmed with the PDI results (PCB concentrations less than 21 mg/kg) and adjusted outward if needed during the RD. The PDI results for depth sampling will also be used to identify whether any of the PCB removal areas will require excavation of subsurface soil (PCB concentrations greater than or equal to 97 mg/kg). The design will also evaluate and identify the appropriate backfill and vegetative cover materials. The management of PCB residuals for the nonresidential areas will be addressed in the soil management plan portion of the long-term O&M plan. If any of the nonresidential areas require excavation at depth and are located near structures, additional PDI efforts may be needed to support the RD.

4.1.1.6 Removal and Off-Site Disposal or Stabilization of Creek Bank Soil

The design for creek bank areas will focus on the areas identified in the OU-1/OU-2 ROD and includes approximately 1,400 linear feet of creek banks along various portions of Snow Creek as shown on Figure 2-6a through Figure 2-6j. The potential to evaluate additional creek bank areas along Snow Creek for stability related concerns will be considered in the PDIWP. For areas requiring creek bank stabilization, the RD will evaluate a range of creek bank stabilization techniques, including both engineered approaches (e.g., riprap, reinforced mats, and sheet piling) and naturalized bank stabilization (e.g., not maintaining a riparian buffer zone and limiting shoreline access, and live planting or repurposing of felled trees, cut brush, or root balls). PDI efforts to support this component of the remedy include soil borings, geotechnical characterization, and possibly hydraulic modeling to assess the potential impacts of hardening creek banks if deemed necessary to protect local infrastructure.

4.1.1.7 Removal and Off-Site Disposal of Soil from T-11 Area

A key remedy component for the T-11 area is the removal and off-site disposal of soil. This includes the excavation of PTW in the area directly surrounding groundwater well T-11 to an approximate depth of 4 feet. The soil borings and geotechnical characterization of soil gathered during the PDI will be used to assess options for braced excavation and other approaches to focus the deeper excavation activities to just the PTW materials identified in the OU-1/OU-2 ROD. The design will consider the construction sequence for excavation activities because the deeper excavation may best be conducted after the 18-inch layer of soil is initially removed.

The excavation design will evaluate options to support the mobilization of excavation equipment to the T-11 area, the excavation and transportation of soil from the T-11 area, and the subsequent construction of the low-permeability cap discussed in Section 4.1.1.8.

PDI efforts focused on soil borings and the geotechnical characterization of soils will be conducted to support the excavation design. Details for the PDI will be presented in the PDIWP and will be integrated with data needs for designing the low-permeability cap.

4.1.1.8 Low-Permeability Cap for T-11 Area

The design of the low-permeability cap for the T-11 area will be developed to prevent precipitation from infiltrating the soil that remains following removal activities. The soil removal activities conducted prior to placement of the cap are described in Section 4.1.1.7 and include excavation of PTW directly surrounding groundwater well T-11 area and excavation of an 18-inch-thick layer over the broader T-11 area. The cap itself will include multiple layers as described in Section 2.2.6.3, including an initial base soil layer, a low-permeability geomembrane, a geocomposite drainage layer, an overlying protective soil layer, and a vegetative surface. The cap will be designed to incorporate penetrations for multiple groundwater extraction wells and the potential that a groundwater treatment plant could be constructed on the cap's surface. The design evaluations will consider the possibility of locating the groundwater treatment plant on the upland area located west of Snow Creek due to the challenges associated with accessing the T-11 area that include either crossing Snow Creek or an active railroad line. If the groundwater treatment plant is located to the west of Snow Creek, the cap design will need to include accommodations that could support piping for conveying extracted groundwater to the treatment plant.

The design of the low-permeability cap will also be integrated with the T-11 soil removal and creek bank stabilization aspects of the T-11 design. The PDI efforts will include soil borings and the geotechnical characterization of soil and will be integrated with the data needs for excavation and access determinations in the T-11 area. Details for PDI will be presented in the PDIWP.

4.1.2 Groundwater

The PDI activities and data evaluation, along with existing knowledge and operational experience of the pump-and-treat systems installed at OU-3, will be used as the basis for the RD of the extraction and treatment system at the T-11 area. This treatment system will (i) extract PCB-impacted groundwater, (ii) treat PCBs in the extracted groundwater via activated carbon and, (iii) discharge treated groundwater to Snow Creek under NPDES permit equivalency.

The RD will consider the proposed extraction well locations, predicted capture zones, and construction details for wells, as well as the treatment system piping layout and discharge location. Groundwater-related RD requirements at the Eastside Properties and near PB-RR-37 will be established following analysis of the data collected during the PDI, as described above in Section 3.1.2.1.

4.1.2.1 Extraction

Groundwater from the T-11 area will be extracted from two wells installed in the transmissive portion of the aquifer. The locations of these wells will be established using PDI results. The extraction wells will be sized, designed, and located such that the system capture zone is optimized based on the aquifer testing conducted during the PDI. The wells will be equipped with submersible pumps, valves, and pressure gauges. The electrical power source for the submersible pump motors will be evaluated as part of the RD process. Pump control instrumentation and level-control conductivity probes will be considered for pump operation to maximize pump lifetime. Run time meters are anticipated on pump control panels to record pump operation times. Pump discharge piping will be routed to the carbon treatment system.

4.1.2.2 Treatment

Extracted groundwater will be treated with liquid-phase granular activated carbon. The carbon filtration system parameters, such as carbon type and vessel sizing, will be established using the results of the PDI. The T-11 area system is anticipated to include two carbon vessels that are arranged in a lead-lag configuration and housed in a weather-protective enclosure. The system is anticipated to be equipped with a flow meter, particulate filter(s), valves, pressure gauges, and fittings installed such that the order of groundwater flow through the vessels can be changed if constituent-of-concern breakthrough in the lead vessel is detected. Sampling ports will be installed on the system piping upstream of the lead carbon vessel, at the midpoint between the carbon vessels, and downstream of the lag vessel. The effluent from the lag carbon vessels will be piped to Snow Creek.

4.1.2.3 Discharge

The treated groundwater from the T-11 area will be discharged into Snow Creek. The current design approach includes use of the permit equivalency process under Section 300.400 (e) (1) of the National Contingency Plan since the T-11 area and Snow Creek are part of the Site. This approach is consistent with the permit equivalency approach under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and used at similar sites. The location of the discharge will be established based on the PDI results as will the final locations of the extraction wells and the treatment system equipment. Routine monitoring samples of the treated groundwater will be collected from the sampling ports and analyzed for PCBs to confirm the effectiveness of the treatment system and the quality of the discharge to Snow Creek.

4.1.3 Snow Creek Sediment

In accordance with the ROD, the OU-1/OU-2 sediment remedy will include excavating contaminated sediment in Snow Creek and disposing of the sediment at an appropriate off-site disposal facility. The RD will define the extents of sediment removal required and provide the performance requirements for the removal. The remedial contractor will be responsible for selecting the means and methods to complete the removal. The following sections describe the RD activities for the sediment removal portion of the remedy.

4.1.3.1 Sediment Removal

The first step in the sediment remediation design process will be to define the horizontal and vertical extents of the sediment removal and calculate the resulting removal areas and volumes. The target sediment removal areas will be defined using data collected during the PDI to supplement the existing sediment data. Sediment deposits and soft sediment mapped during the PDI with 0.2 feet or more of sediment will be evaluated for removal. The sediment removal areas will be delineated based on sediment deposits with mean concentrations greater than or equal to the following remedial goals:

- PCBs: 3 mg/kg
- Barium: 322 mg/kg
- Chromium: 111 mg/kg
- Cobalt: 59 mg/kg

- Lead: 128 mg/kg
- Manganese: 1,100 mg/kg
- Mercury: 1 mg/kg
- Nickel: 46 mg/kg
- Vanadium: 41 mg/kg

As described in Section 4.1.1.4, Dredge Spoil Area SC-8 will be excavated concurrently with the sediment removal activities because this dredge spoil area lies immediately adjacent to the creek.

The Preliminary (30%) RD submittal will present the preliminary plans showing the horizontal and vertical limits of the sediment removal based on the PDI results. The RD will also evaluate the sequence for removing the sediment.

A large portion of the previously identified total sediment volume was observed at the Highway 202 culverts as part of the 1999 RFI. Based on the data summarized in the OU-1/OU-2 FS, the sediment deposits at the Highway 202 culverts were previously estimated to contain more than 50% of the total sediment volume anticipated for removal. The RD will refine the extent and estimated volume of sediment removal at the Highway 202 culverts and evaluate the methods for removal, along with special safety precautions while working within the culverts. Because the sediment removal activities are expected to remove most, if not all, of the sediment located within the Highway 202 culverts, the RD will evaluate how the sediment removal from the culverts may affect flow within Snow Creek and the potential for upstream and downstream flooding. The results of this evaluation will be presented in the Preliminary (30%) RD submittal.

At the downstream end of OU-1/OU-2, Snow Creek transitions to an underground concrete-lined channel beneath Quintard Mall. The presence and extent of any contaminated sediments within this underground channel are currently unknown but will be evaluated during the PDI. During the RD, the data gathered during the PDI will be compared with the remedial goals for sediment within the channel. If sediment within the channel requires removal, the RD will define the extent and estimate the volume of sediment removal and evaluate potential removal methods.

Where sediment removal is required near the creek bank and structures, the RD will evaluate the stability of the existing bank side slopes, utilities, and adjacent structures. The existing conditions will be evaluated to assess whether the removal has the potential to undermine the toe of the slope or existing structures. Although not anticipated, if the potential is there, a slope setback may be required to prevent undermining or reducing the stability of slopes and structures. The extent of any necessary slope setbacks or structural offsets will be evaluated during the RD phase.

It is anticipated that sediment removal will be required at various locations along the approximate 4-mile section of Snow Creek in OU-1/OU-2. As such, several points of access to the creek are anticipated to be needed, and multiple locations are anticipated to be needed for sediment handling and loadout. This may in some cases require the construction of temporary access roads that may be removed following completion of the work. The decision as to whether the temporary access roads are removed, and the areas restored will be based on landowner preferences. As the final sediment removal areas are delineated, the RD will evaluate properties where creek access could

be required for sediment removal or materials handling purposes. The needs for material handling could include dewatering and/or loading the materials into trucks for transport to the off-site disposal facility. The process for evaluating and acquiring property access will be conducted during development of the PDIWP because, in many cases, the creek itself is owned by the adjoining landowner. The access identification and acquisition processes will continue into the RD, and the 30% RD submittal will identify potential locations for accessing the creek to remove sediment and stage it for dewatering and/or off-loading. Final locations of creek access will be identified in the Pre-final (95%) RD.

It is also anticipated that trees will need to be trimmed or removed in some areas to facilitate access and for constructing and removing the temporary sediment handling areas. Requirements for clearing and tree trimming will be evaluated during the RD.

It is currently anticipated that sediment will be removed using mechanical excavation equipment and that the dredged sediment will be transported by truck to a temporary staging area for processing prior to eventual transport for off-site disposal. The sediment removal methods will be evaluated during the RD. The RD will also evaluate whether the sediment will be removed under normal creek flow conditions or if the creek flow will be bypassed to allow incremental removal of sediment deposits working from upstream to downstream under "dewatered" condition.

The sediment removal might result in resuspended sediment and cause some short-term increases to suspended solids in the water column by the digging buckets. This might result in an associated temporary increase in the constituent of concern concentrations in surface water. Best management practices to control and monitor the sediment resuspension will be evaluated during the RD and described in the design submittals.

The need for backfill after excavation, will be evaluated during the RD. Backfill would not be placed in high-velocity areas where the materials could be washed downstream during high-flow events, locations where the backfill might exacerbate localized flooding, or locations where the placement of backfill might result in creek bank erosion.

4.1.3.2 Sediment Processing/Dewatering

The excavated sediment will require material handling, processing, and dewatering to prepare it for disposal at an off-site landfill. In addition, water generated during sediment handling and dewatering may require treatment. The need for water treatment and whether additional data are needed will be evaluated during the development of the PDIWP as part of the data gap assessment. If additional data for water treatment are needed, a TSWP will be prepared and details regarding sampling and analysis will be presented in the TSWP and QAPP amendment. As described above, the locations of the material handling areas will be evaluated and ultimately identified in the RD.

The design for material handling, dewatering, and potential water treatment will consider the space and area available along the creek, the sediment volumes, the sediment physical characteristics, the overall sequence and schedule of the removal activities, anticipated production rates, and the removal methods.

It is anticipated that the sediment dewatering approach will include dewatering by gravity or amending the dredged sediment with a stabilization amendment or a combination of the two. The RD will evaluate whether a treatability study is needed to assess potential dewatering methods.

Debris removed during sediment excavation will be processed as necessary to allow off-site disposal. As necessary, debris items may need to be cut to size to facilitate transport and disposal.

The need for on-site treatment of the water that is generated during sediment dewatering will also be evaluated during the RD.

4.1.3.3 Off-Site Disposal of Sediment

In accordance with the ROD, the excavated sediment will be transported for disposal at an appropriate off-site disposal facility. Disposal decisions related to PCBs will be based on in-place total PCB concentrations from grab samples. Data collected during the PDI will be used to support waste characterization of the excavated sediment.

Waste materials with PCB concentrations greater than or equal to 50 mg/kg will be disposed of in a licensed Toxic Substances Control Act- (TSCA-) regulated disposal facility. Waste materials with PCB concentrations less than 50 mg/kg will be designated for disposal at a landfill permitted under Subtitle D of RCRA.

After the sediment has been dewatered, the excavated materials will be transported to the off-site disposal facilities using over-the-road trucks and licensed haulers in accordance with appropriate local, state, and federal regulations.

Additional details related to the requirements for off-site transportation and disposal will be presented in the RD deliverables, including potential transportation routes.

4.2 Green and Sustainable Remediation Practices

This section of the RDWP presents the green and sustainable remediation practices (GSR) that will be integrated into the RD for OU-1/OU-2.

4.2.1 Objectives and Guidance

The RD will integrate green and sustainable remediation practices (USEPA 2009) to the extent appropriate given the specific OU-1/OU-2 components and the characteristics of the Site setting. The SOW identifies the existing USEPA guidance on green remediation. Specific guidance and reference documents associated with green and sustainable remediation that will be consulted as part of the RD include the following:

- USEPA's Superfund Green Remediation Strategy (USEPA 2010)
- ITRC's Green and Sustainable Remediation: State of the Science and Practice. Technology Overview (ITRC 2011a) and Green and Sustainable Remediation: A Practical Framework. Technical/Regulatory Guidance (ITRC 2011b)
- National Research Council's (NRC) Sustainability and the U.S. EPA (NRC 2011) and Sustainability Concepts in Decision-Making, Tools and Approaches for the U.S. Environmental Protection Agency (NRC 2014)
- Naval Facilities Engineering Systems Command's (NAVFAC) Department of the Navy Guidance on Green and Sustainable Remediation (NAVFAC 2012a) and Integrating Green and Sustainable Remediation Metrics within the CERCLA Process during the Feasibility Study (NAVFAC 2012b)

- United State Army Corp of Engineer's (USACE) Evaluation of Consideration and Incorporation of Green and Sustainable Remediation (GSR) Practices in Army Environmental Remediation (USACE 2012)
- American Society for Testing Materials (ASTM) E2893-13e1, *Standard Guide for Greener Cleanups* (ASTM 2013)

4.2.2 Implementation

Green and sustainable remediation opportunities will be evaluated through each stage of the RD. Green technologies that are identified as appropriate to the OU-1/OU-2 RD based on an evaluation of their attributes will be incorporated into the design specifications for the remediation contractor. The evaluations will consider the cited guidance documents at the outset of the design process and will continue to identify opportunities throughout the RD process. Example opportunities may include the following:

- Use of reclaimed material that meets the requirements detailed in specifications for backfill material
- Use of woody materials generated during tree clearing as part of soft creek bank stabilization designs
- Removal and appropriate disposal of invasive species as part of vegetation clearing operations
- Use of green concrete for constructing support and staging areas
- Beneficial reuse of processed excavated material
- Use of low-impact development technology in temporary construction areas
- Use of clean diesel fuels and vegetable-based hydraulic fluids in construction equipment and trucks

4.3 Remedial Design Submittals

The RD process for OU-1/OU-2 is guided by the CD and SOW and includes a sequence of design deliverables that incrementally build to a final design that can be approved by USEPA and then used by P/S to procure, construct, and maintain the approved remedy. Descriptions of the RD deliverables and the associated design support documents are provided in this section of the RDWP.

4.3.1 Preliminary (30%) Design Submittal

The Preliminary (30%) RD submittal will combine each design component into an integrated Design Report that will include the following elements:

- A Design Criteria Report, developed following guidance in the USEPA *Remedial Design/Remedial Action Handbook* (USEPA 1995) including the installation, monitoring, and maintenance of erosion control best management practices
- Tables presenting the basis of design elements for the RD

- Summary of the PDI and treatability study results and evaluations (as applicable) and their influence on the RD
- Preliminary drawings and specifications (including drawings and specifications for the soil,[1] groundwater, and sediment[1] components of the remedy)
- Description of permit equivalencies and how they will be addressed
- Description of how the RA will be implemented in a manner that minimizes environmental impacts in accordance with USEPA's Principles for Greener Cleanups
- Description of monitoring and control measures to protect human health and the environment, such as air monitoring, dust suppression, odor control, resuspended sediment migration, and water quality, as applicable, during remedy implementation
- Estimate of costs including construction and O&M
- Proposed RD schedule and process for RD revisions, as applicable
- Draft RA sequence including procurement, construction and O&M
- Outlines for the following plans:
  - O&M manual
  - O&M plan
  - Transportation and disposal plan
  - Institutional controls implementation and assurance plan (ICIAP)
  - Updates of the supporting deliverables, including the OU-1/OU-2 RD/RA HASP, OU-1/OU-2 RD/RA ERP, and OU-1/OU-2 RD/RA QAPP

4.3.2 Pre-final (95%) Design Submittal

The Pre-final (95%) RD submittal will incorporate, as appropriate, USEPA comments on the Preliminary (30%) RD submittal and will present complete designs for the various design components. The submittal will include complete drawings, specifications, and supporting documents. Pre-final (95%) RD drawings will show existing conditions including property boundaries, easements, and plan view, cross section, and engineering details to guide construction of the remedy. The Pre-final (95%) RD submittal will include a specification for photographic documentation for the remedy during and following construction and updates for previously submitted RD support documents. Complete versions for the RD support documents submitted as outlined in the Preliminary (30%) RD submittal will be provided with the Pre-final (95%) RD submittal.

If USEPA approves the Pre-final (95%) Design Package without comments, submittal of a separate Final (100%) Design Package will not be necessary.

[1] Preliminary drawings will show the horizontal and vertical limits of the soil and sediment removal based on the PDI results.

4.3.3 Final (100%) Design Submittal

The Final (100%) RD submittal will address USEPA comments on the Pre-final (95%) RD. The Final (100%) RD submittal will be the basis from which the selected remediation contractor(s) will implement the remedy.

4.3.4 Design Support Deliverables

There are a significant number of documents being developed to support the RD process. While many of these documents are described elsewhere in this RDWP (e.g., PDIWP, QAPP), a brief description of each supporting document is provided below for completeness. The SOW identifies these supporting documents as being submitted for USEPA approval recognizing the process identified in the SOW for the revision and resubmittal of documents if requested by USEPA.

4.3.4.1 Monthly Progress Reports

Progress reports describing activities completed to support the OU-1/OU-2 RD/RA will be submitted to USEPA monthly. Each progress report will be combined with the monthly progress report that is prepared for the other OUs at the Site. The monthly progress report materials for the OU-1/OU-2 RD will include a description of activities completed during the prior reporting period, such as actions that have been taken toward achieving compliance with the CD; a summary of all sampling and other data received or generated; a description of deliverables submitted; upcoming activities that are scheduled for the next month; updates to construction schedules; a description of modifications to work plans or other schedules; and a description of all activities undertaken to support the Community Involvement Plan.

4.3.4.2 Health and Safety Plan

The OU-1/OU-2 RD/RA HASP (P/S 2021a) was developed to provide plans and procedures to safely implement the RD and RA. The HASP is included as Appendix A to this RDWP.

4.3.4.3 Emergency Response Plan

The OU-1/OU-2 RD/RA ERP (P/S 2021b) is included as Appendix B to this RDWP and was developed to provide procedures that can be used during an emergency event. The OU-1/OU-2 RD/RA ERP was developed to be used in collaboration with the OU-1/OU-2 RD/RA HASP.

4.3.4.4 Quality Assurance Project Plan

As described in Section 3.4, a QAPP will be developed to address requirements for sample analysis and data handling associated with implementing the PDI, treatability studies, and other activities to support the OU-1/OU-2 RD/RA. The QAPP will be developed in accordance with USEPA guidance including the Uniform Federal Policy format and submitted as an attachment to the PDIWP. The QAPP will be prepared as a living document that can be amended or supplemented as the overall project evolves from the PDI stage and into RD and RA activities.

4.3.4.5 Predesign Investigation Work Plan

As described in Section 3.1, a PDIWP will be developed to summarize how existing data for the Site were evaluated to identify data gaps to complete the RD along with a description of how the PDI will be used to fill those data gaps. The PDIWP will also provide the details of each PDI scope of work and the purpose of each scope in filling the identified data gaps. The PDIWP will be submitted to USEPA, with the QAPP as an attachment.

4.3.4.6 Treatability Study Work Plan

As described in Section 3.3, a TSWP may be developed to provide details for each treatability study, including the overall purpose, data gaps, and data quality objectives. A determination as to whether treatability studies are needed would be presented in the PDIWP. If needed, the TSWP would be submitted to USEPA with a QAPP amendment as an attachment.

4.3.4.7 Field Sampling Plan

As described in Section 3.1.7, FSP details will be developed to address all sample collection and other data collection activities that are part of the PDI, treatability study, and other sampling or monitoring activities that will be completed to support the OU-1/OU-2 RD/RA. The FSP details included as a component of the PDIWP, TSWP, and other OU-1/OU-2 monitoring plans will be developed in accordance with *Guidance for Conducting Remedial Investigations and Feasibility Studies* under CERCLA (USEPA 1988).

4.3.4.8 Construction Quality Assurance/Quality Control Plan

The construction quality assurance and quality control plan (CQA/QCP) will satisfy the requirements of the SOW and describe planned and systematic activities to provide confidence that the RA satisfies the requirements and quality objectives of the approved design package. An outline for the CQA/QCP will be provided with the Preliminary (30%) RD submittal, and any comments from USEPA will be addressed in the CQA/QCP that is submitted with the Pre-final (95%) RD with potential amendments to the CQA/QCP following contractor selection.

4.3.4.9 Transportation and Off-Site Disposal Plan

The transportation and off-site disposal plan (TODP) will describe plans to ensure compliance with off-site shipment requirements set forth in Section 6.7 of the SOW. The TODP will be prepared and submitted to USEPA for review and approval after the remediation and waste disposal contractors are procured. The content of the TODP will satisfy the requirements of the SOW.

4.3.4.10 Operation and Maintenance Plan

The O&M plan will be developed in accordance with the SOW and include requirements for inspecting, operating, and maintaining the RA. A key component of the O&M plan will be a soil management plan that provides a framework for managing residual PCBs that might be encountered during future intrusive activities on residential and nonresidential properties. A preliminary approach for providing soil management support while the RD is under development is presented in Section 7.3 of this RDWP and reflects a 20-year history of P/S providing soil management support for OU-1/OU-2 and OU-4 on an as-requested basis. The outline for the O&M plan will be submitted with the Preliminary (30%) RD, and the draft plan that addresses USEPA comments regarding the outline will be submitted with the Pre-final (95%) RD.

4.3.4.11 Operation and Maintenance Manual

The O&M manual will be developed in accordance with the SOW for those aspects of the remedy that include equipment to operate and maintain to keep the remedy effective over the long-term. A key component of the O&M manual will be instructions for operating and maintaining the groundwater extraction, treatment, and discharge system. The O&M manual will identify procedures for changing-out and backwashing carbon vessels. The O&M manual will also include a list of spare parts that should be kept on hand in the event of a mechanical breakdown. The

outline for the O&M manual will be submitted with the Preliminary (30%) RD and the draft manual that addresses USEPA comments regarding the outline will be submitted with the Pre-final (95%) RD.

4.3.4.12 OU-1/OU-2 Monitoring Plan

The OU-1/OU-2 monitoring plan will describe the baseline, and short- and long-term monitoring to be completed prior to and during implementation of the RA. The content of the OU-1/OU-2 monitoring plan will satisfy the requirements of Section 6.7(e) of the SOW and will be designed to collect data that will be used in completing the 5-year reviews.

4.3.4.13 Institutional Controls Implementation and Assurance Plan

The ICIAP will describe how the OU-1/OU-2 ICs will be implemented, maintained, and enforced to the extent warranted given preexisting ICs and site-specific conditions. The ICIAP will be developed in accordance with *Institutional Controls: A Guide to Planning, Implementing, Maintaining, and Enforcing ICs at Contaminated Sites* (USEPA 2012a) and *ICs: A Guide to Preparing ICs Implementation and Assurance Plans at Contaminated Sites* (USEPA 2012b). The ICIAP will be prepared based on the requirements of the SOW and provided to USEPA for review and as part of the Pre-Final (95%) RD submittal.

5 ARARS AND PERMIT EQUIVALENCY

The approach to incorporate ARARs into the RD is described below, including a summary of the key ARARs and the proposed approach for achieving permit equivalencies.

5.1 ARARs and Permit Equivalency Requirements

The OU-1/OU-2 RD/RA is being conducted under the USEPA CERCLA program, and federal, state, and local regulatory permits are not required. In this process, regulatory approvals are achieved through permit equivalents as defined under CERCLA. Using this approach, CERCLA response actions are exempted by law from the requirement to obtain federal, state, and local permits related to activities conducted on the Site, provided that the activities conducted are protective of human health and the environment.

Based on the work described in the CD and the ARARs identified in the OU-1/OU-2 ROD, the substantive requirements for a wide range of ARARs will be assessed as part of the RD. The following is a preliminary list of the key ARARs:

- Regulations at 40 CFR § 262.11(a)-(d) for the management and disposal of remediation wastes
- Regulations at 40 CFR § 761 for the management and disposal of PCB remediation wastes
- Regulations at 40 CFR § 761.61(c) for risk-based disposal of PCB remediation wastes
- Regulations at ADEM Admin. Codes r. 335-5-1, 335-13, and 335-14 to address uniform environmental covenants, waste materials, and groundwater treatment and discharge, respectively
- State and Federal Safe Drinking Water Act MCLs
- Regulations at ADEM Admin. Code r. 335-6-6-.04 and ADEM Admin. Code r. 335-6-6-.14 for discharge of treated groundwater to surface water
- Regulations at ADEM Admin. Code r. 335-9-1-.05 and ADEM Admin. Code r. 335-9-1 -.06 for construction of new extraction wells
- Regulations at ADEM Admin. Code r. 335-6-12 for discharges associated with regulated construction activity that will result in land disturbance equal to or greater than one acre
- Regulations at 40 CFR § 131.36 for the chronic Ambient Water Quality Criteria (AWQC) and the parallel regulations under the State of Alabama's Administrative Code 335-6-10
- Regulations at 40 CFR § 230 regarding dredging and filling in the creek
- Regulations at United States Code (U.S.C) 4001 et seq. and 4101 regarding alteration of the creek.

Comprehensive lists of chemical-specific, location-specific, and action-specific ARARs were identified in the OU-1/OU-2 ROD (USEPA 2017) and are included as Appendix C to this RDWP. These ARARs will be assessed while developing the Preliminary (30%) RD and the assessment will confirm whether the ARARs apply and, for those that do, how the requirements of the ARAR will be incorporated into the RD. The assessment will also consider the possibility that there are ARARs that were not identified in the OU-1/OU-2 ROD and could be applicable to the work.

5.2 Approach for Achieving Permit Equivalencies

The RD will be developed to achieve the substantive requirements of the ARARs without formally applying for permits or having to receive permits. This approach is consistent with USEPA guidance (Long 1992) and applies to on-site actions. Based on USEPA's definition for the Site, the permit equivalency approach for OU-1/OU-2 is applicable to all seven categories of remedies identified in the CD and is inclusive of the RA that is planned for soil, groundwater, and sediment. The regulatory review process for approving the permit equivalency will be based on agency review of the design deliverables presented in Section 4.3.4 of the RDWP.

6 REMEDIAL DESIGN SCHEDULE

The schedule to complete the RD is based on the requirements of the SOW. The schedule and uncertainties that could potentially influence the RD schedule are discussed in this section.

6.1 RD Schedule

The OU-1/OU-2 RD is a multiyear effort culminating in documents that can be used to secure USEPA approval and hire a remediation contractor(s) to implement the approved remedy. The RD builds on a large base of existing data and will be supplemented with new information collected through the PDI process. The combination of existing data and new information gathered through a range of field and laboratory PDIs will support multiple design evaluations that collectively constitute the overall RD effort.

The schedule for RD deliverables based on these activities is presented in Table 6-1 and is consistent with the SOW including the deliverables identified in Section 4.3. The schedule presented in Table 6-1 is based on milestone events identified in the SOW. The table provides a reference to the associated schedule requirement presented in the SOW, the associated schedule details (e.g., the PDIWP will be submitted 60 days following USEPA approval of the RDWP), and a final column for the actual date (which will be based on USEPA's approval date for this RDWP). This milestone schedule has been completed to reflect actual submittals dates, including this RDWP, and will be updated and presented in the monthly progress reports following submittal of the RDWP.

6.2 Uncertainties that Could Affect the RD Schedule

There are several factors that could influence the timing of the RD:

- Securing property access necessary to conduct the PDI and RA work
- Multiple phases of PDI efforts, which could be needed based on initial sampling results
- Weather conditions (e.g., severe weather events) that could delay work efforts
- Extended document review schedules

Factors other than those listed above could also influence the schedule. Effective and open communications will be critical to completing the RD in a timely manner. The RD process is also flexible such that components of the design could be separated from the main RD schedule with USEPA approval. For example, the opportunity to accelerate a component of the remedy might warrant separating it from the main RD schedule. Similarly, an extended PDI process for a given media or component of the remedy might warrant separating it from the main RD schedule recognizing that changes in the RD schedule require USEPA approval.

7 REMEDIAL DESIGN AND REMEDIAL ACTION SEQUENCING

This section presents the proposed approach to provide support related to residential removals under the NTCRA Agreement and AOC and support for ongoing soil management. The proposed approach is for the time period up to USEPA approval of the final RD. The preliminary approach for implementing the RA is also presented in Section 7.4, recognizing that this approach may be adapted as the RD continues to develop.

7.1 Interim Operation and Maintenance Obligations

The IMs shown on Figure 2-3 have been operated and maintained since their construction based on the design and construction documents and the associated regulatory approvals provided in Appendix A of the OU-1/OU-2 RI (ENVIRON 2015). Long-term O&M of these IMs will continue using these current plans and procedures while the RD is being developed. The RD will use the O&M plans and procedures, the historical O&M experience gained since construction of the IMs, and engineering design aspects of the RD to develop a consolidated long-term O&M approach for the OU that includes these IMs.

7.2 Residential Removal Action Support

Until the RD is approved by USEPA, the proposed approach for providing residential removal support is to conduct the work under the respective requirements of the Removal Order and NTCRA Agreement. This process includes time-critical aspects for residential removal projects with surface soil PCB concentrations greater than or equal to 10 mg/kg under the Removal Order and the non-time-critical aspects of residential surface soils with PCB concentrations greater than or equal to 1 mg/kg and less than 10 mg/kg under the NTCRA Agreement. This approach provides the time necessary to obtain access for many of the residential removals slated to occur where access has been denied or for those properties that are in State receivership due to back taxes. The approach also provides for a less disruptive and efficient process by focusing NTC construction activities into a single time window.

As noted previously, properties that are deemed unsuitable for removal do not require removal until such time that the vegetation is cleared by the property owner. Should an unsuitable property be cleared as the RD is being prepared, the property would be remediated based on the requirements of the Removal Order and NTCRA Agreement. Once the RD is approved, it will become the controlling document for meeting the residential removal obligations, including properties where access has been denied, are in State receivership, or are unsuitable for removal, as well as the controlling document for meeting long-term O&M requirements, including future soil management support.

7.3 Soil Management Support

Soil management for residential and nonresidential portions of OU-1/OU-2 is an ongoing process and will continue while the OU-1/OU-2 RD is being prepared. The current approach depends heavily on relationships between P/S and parties that typically conduct intrusive activities, such as multiple departments from Anniston and Oxford; quasi-governmental agencies, such as the local water and sewer districts; County and State roadway officials; and utility companies and their contractors. The processes for soil management outreach and evaluation are currently configured

to assess the nature of intrusive activities at a given location and provide the party conducting the intrusive activities with a decision as to whether soil management support from P/S is necessary. For those situations where P/S provides soil management support, the support can range from identifying handling procedures for PCB-containing residuals to providing off-site transportation- and disposal-related support.

The preliminary approach for providing soil management support under the long-term O&M plan developed as part of the OU-1/OU-2 RD is anticipated to include a formal framework for the evaluation process based on a 20-year history of providing soil management support for OU-1/OU-2 and OU-4 on an as-requested basis. It is envisioned that the soil management support following USEPA's approval of the RD will be initiated through the Alabama 811 "One Call" system as an IC. The preliminary approach for soil management, including notification through the 811 system, will be refined as the RD develops and is further informed through additional soil management support provided by P/S.

7.4 Remedial Action Contracting Approach and Sequencing

Many of the details regarding specific scopes of work and number of potential contracts will be finalized as part of the RD process recognizing that the overall preference, to the extent possible, is to use a single construction contractor. This approach is designed to limit the number of parties who could interfere with one another based on working in proximity or whose work is dependent on another party. For example, work near the T-11 area includes multiple operations that could overlap or conflict if different contractors were hired to implement the work. The multiple construction operations for this small geography near T-11 include the following:

- Sediment removal from Snow Creek
- Creek bank stabilization on both sides of Snow Creek
- Excavation and off-site disposal of floodplain soil located on both sides of Snow Creek
- Placement of backfill and installation of a low-permeability cover at the T-11 area
- Installation and operation of a groundwater extraction and treatment system at the T-11 area

The preferred single-contractor approach will streamline project implementation and reduce the possibility for conflict, yet it will be flexible to include specialty subcontractors that may bring value to discrete tasks. The following are examples where specialty subcontractors may bring value:

- Construction of the groundwater extraction, treatment, and discharge system
- Removal of sediment from confined spaces such as the Highway 202 culverts or the portion of Snow Creek running under the Quintard Mall parking lot
- Off-site transportation of soil and sediment

This approach would allow the value of a specialist to be realized without setting up a situation for conflict between work scopes. Other items such as off-site transportation and disposal could be

contracted directly by P/S to avoid markup by the general contractor. Alternatively, the transportation and disposal could be included with the general contractor's scope of work to avoid potential work stoppages due to the unavailability of trucks for transporting the soil and sediment to the disposal facility.

Another variable that could affect the RA contracting process (and schedule) is the extension of a work element. For example, if several phases of PDI work are necessary for the Eastside Properties area, this could result in a separate RA contract.

The general approach described above will be refined throughout the RD process and communicated to USEPA through design deliverables. To limit the time between USEPA's approval of the final RD and the start of RA construction, P/S will initiate the procurement process between the Preliminary (30%) RD and Pre-final (95%) RD deliverables. This process recognizes the multiple steps necessary to complete the procurement process and provides an opportunity for contractor feedback on the design as it is being finalized. For example, the Preliminary (30%) RD submittal could be used to support a prequalification process for potential contractors. The prequalification process would assess contractor capabilities, including personnel and equipment, experience in successfully completing similar projects, and historical safety performance metrics. This prequalification step could run parallel with preparation of the Pre-final (95%) RD submittal, and contractors would also be asked to provide constructability suggestions as part of demonstrating their expertise. The prequalification process would generate a pool of qualified contractors and could be used to assess if a sufficient pool of qualified contractors was available to implement the project as one scope of work. Contractors deemed to be qualified through the prequalification process could participate in the bidding process that may be conducted on the Pre-final (95%) RD submittal in the interest of advancing schedule consistent with other similarly scaled remediation projects. Any enhancements to the RD that are made in progressing to the Final (100%) RD submittal could be incorporated in the procurement process prior to contract finalization or via change order.

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TABLES

Table 1-1. SOW Requirements for the RDWP
OU-1/OU-2 Remedial Design Work Plan
Anniston PCB Site, Anniston, Alabama

SOW Section 3.1	Description	Location in RDWP
(a)	Plans for implementing all RD activities identified in the SOW	Sections 3 and 4
(b)	Description of the overall management strategy for implementing the RD	Section 1.2
(c)	Description of the proposed general approach to contracting, constructing, operating, maintaining, and monitoring the RA	Sections 4, 6, and 7
(d)	Description of the responsibility and authority of all organizations and key personnel involved with development of the RD	Section 1.4
(e)	Descriptions of any areas requiring clarification and any anticipated problems, such as data gaps	Sections 2 and 3.1
(f)	Description of proposed predesign investigations	Sections 3.1, 3.2, and 3.3
(g)	Description of applicable substantive regulatory requirements that will be evaluated through the permit equivalency process	Section 5
(h)	HASP that will be developed in accordance with 29 CFR Section 1910.120.	Appendix A
(i)	ERP that provides the following: - Entity and organizations responsible for responding to an emergency incident - A plan to support meetings with applicable parties, including federal and state agencies, the local community, emergency squads, and hospitals in the event of an incident - A plan to develop spill prevention, control, and countermeasures plans where applicable - Notification and reporting requirements in the event of a spill or release - Description of activities to ensure compliance in the event of a spill, release, or threat of release that creates or might create an emergency or presents an immediate threat to public health or welfare	Appendix B

Notes:
ERP: emergency response plan
HASP: health and safety plan
RD: remedial design
RDWP: remedial design work plan
SOW: statement of work

Table 6-1. Remedial Design Schedule
OU-1/OU-2 Remedial Design Work Plan
Anniston PCB Site, Anniston, Alabama

Item	Relevant Section of CD/SOW	Timeline for Completion	Actual Completion	Approval
RD Schedule				
Identify the Supervising Contractor	CD VI.9	10 days after Effective Date	April 5, 2021	April 16, 2021
Financial Assurance Mechanism	CD IX.27	Within 10 days after Effective Date	April 12, 2021	May 24, 2021
Financial Assurance Documentation	CD IX.27	30 days following USEPA approval of financial assurance method (June 23, 2021)	June 18, 2021	--
Submit Draft RDWP, HASP, and ERP	SOW 3.1	Within 60 days following receipt of USEPA's Authorization to Proceed regarding the Supervising Contractor (June 15, 2021)	June 15, 2021	--
Submit Revised RDWP, HASP, and ERP	SOW 3.1	Within 30 days following receipt of USEPA's Comments on the Draft RDWP, HASP and ERP (July 20, 2021)	August 19, 2021	
Submit Draft PDIWP, FSP, and QAPP	SOW 3.3(a)	60 days following USEPA approval of RDWP		
Preliminary (30%) Design	SOW 3.3(a), 3.4	120 days following USEPA approval of PDI Report		
Pre-Final (90%/95%) Design	SOW 3.5	150 days following USEPA comments on 30% Design		
Final (100%) Design	SOW 3.6	60 days following USEPA comments on 95% Design		
Draft Notice to Successors-In-Title	CD VIII.23.a	15 days after Effective Date	April 12, 2021	June 2, 2021
Record Notice to Successors-In-Title	CD VIII.23.a	Within 10 days after USEPA approval of draft notice	June 3, 2021	--
Certified Copies of Notices to Successors-In-Title	CD VIII.23.a	Within 10 days after recording notices	June 9, 2021	--
Submit certificates of insurance naming USEPA as an additional insured	CD XI.41	15 days prior to commencing on-site Work		
Identify a Community Involvement Coordinator (if requested)	-	15 days following USEPA request		

Table 6-1. Remedial Design Schedule
OU-1/OU-2 Remedial Design Work Plan
Anniston PCB Site, Anniston, Alabama

Item	Relevant Section of CD/SOW	Timeline for Completion	Actual Completion	Approval
RA Schedule				
Award RA Contract	-	120 days after USEPA Notice of Authorization to Proceed with RA		
Submit RAWP	SOW 4.1	Submit within Award of RA Contract		
Designate IQAT	SOW 4.2	-		
Pre-Construction Conference	SOW 4.3(a)	Within 30 days after approval of RAWP		
Start of Construction	-	Within 60 days after approval of RAWP		
Completion of Construction	SOW 4.6(b)	as described in approved RAWP		
Pre-Final Inspection	SOW 4.6(b)	Within 14 days following completion of construction		
Pre-Final Inspection Report	SOW 4.6(d)	Within 14 days following completion of Pre-Final Inspection		
Final Inspection	SOW 4.7	Within 14 days following completion of work identified in Pre-Final Inspection Report		
RA Report	SOW 4.6(d)	60 days following final inspection		
Monitoring Report	SOW 4.7(b)	to be determined		
Work Completion Report	SOW 4.9(b)	to be determined		
Periodic Review of Support Plan	SOW 4.8	for Five-Year Reviews, triggered by start of first RA on 6/8/2015		

Notes:
Effective date is March 26, 2021.
--: not applicable
CD: consent decree
CIC: community involvement coordinator
ERP: emergency response plan
FSP: field sampling plan
HASP: health and safety plan
IQAT: independent quality assurance team
PDI: predesign investigation
PDIWP: predesign investigation work plan
QAPP: quality assurance project plan
RA: remedial action
RD: remedial design
RDWP: remedial design work plan
SOW: statement of work
USEPA: United States Environmental Protection Agency

FIGURES

City: SYR Div/Group: SWG Created By: K.IVES Last Saved By: ldrum
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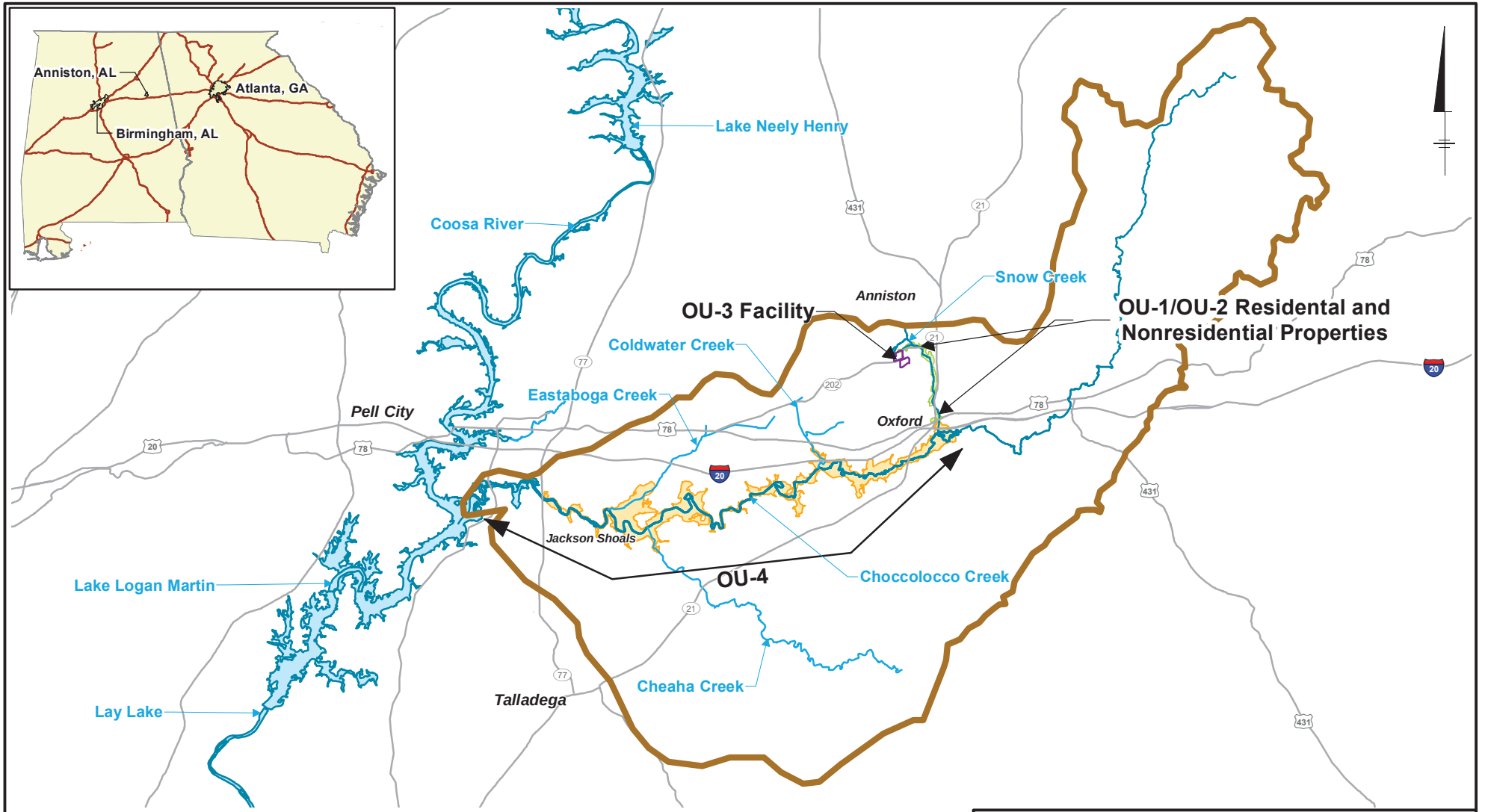

Legend

- Approximate Choccolocco Creek Watershed Boundary as Delineated in Basins 2.0
- OU-4 100-Year Floodplain
- OU-1/OU-2 Downgradient Floodplain
- OU-3 Boundary

0 6 12 Miles

Graphic Scale

Notes:
OU: operable unit
PCB: polychlorinated biphenyl

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Remedial Design Work Plan

Site Location Map

Solutia

Figure
1-1

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: jbistrovich
Anniston
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Legend

- 100-Year Floodplain and Drainage Areas
- OU-3
- OU-4 100-Year Floodplain
- Exposure Unit
- Creek

0 2,200 4,400 Feet

Graphic Scale

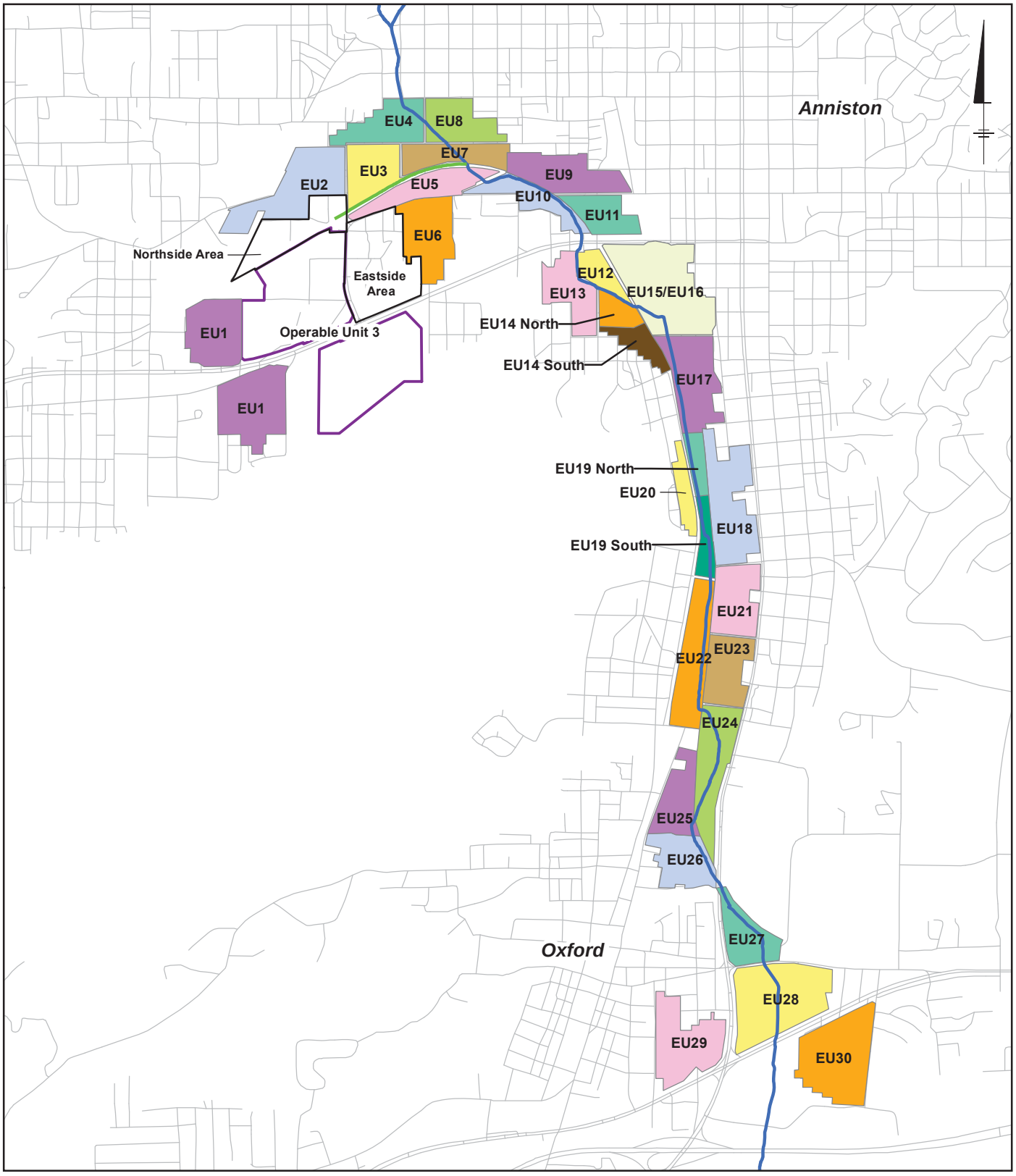
Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. OU: operable unit
   PCB: polychlorinated biphenyl

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama
OU-1/OU-2 Remedial Design Work Plan

OU-1/OU-2 Area

Solutia

Figure
2-1



0 2,750 5,500 Feet

GRAPHIC SCALE

Notes:
EU: exposure unit
OU: operable unit
PCB: polychlorinated biphenyl

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Remedial Design Work Plan

Exposure Units

Solutia

FIGURE
2-2

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Anniston
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11th Street Ditch
Northside Area
APCO Ditch (South Section)
Solutia Facility
Eastside Area
Dredge Spoil Piles Removed
Hall Street Properties
Quintard Mall Property

Alexandria Rd
Cooper Ave
McKleroy Ave
Noble St
18Th St
15Th St
14Th St
Brynton Ave
Crawford Ave
Christine Ave
Perron Ave
10Th St
Eulalon Rd
Clydesdale Ave
Quintard Ave
Henry Rd
Hunter St
202
Fairway Dr
C St
Sunset Dr
Snow Creek
Greenbrier Dear Rd
Coleman Rd
Chestnut St
Front St
Main St
Choccolocco St
Snow St
Barry St
78
20
21
9Th St
78W
Caffey Dr
Hamric Dr

Legend

- Major Roads
- Creek
- Interim Measure Locations
- Dredge Spoil Pile Removed
- OU-3 Boundary
- OU-4 100-Year Floodplain
- OU-1/OU-2 Downgradient Floodplain
- Parcels

Notes:
1. Tax parcels provided by Cahoun County, 2014.

2. APCO: Alabama Power Company
OU: operable unit
PCB: polychlorinated biphenyl

0 2,200 4,400 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama
OU-1/OU-2 Remedial Design Work Plan

OU-1/OU-2 Interim Measures

Solutia

Figure
2-3

City: SYR Div/Group: SWG Created By: K.IVES Last Saved By: jbistrovich
ANNISTON
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-13_DredgeSpoilPiles_CandidateRemedialAreas.mxd 3/26/2016 8:42:56 AM

Legend

- Dredge Spoil Pile In-Place
- Dredge Spoil Pile Previously
- Removed Exposure Unit
- Snow Creek

Residential Parcels

- Removal Conducted
- Parcel Boundary

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. EU: exposure unit
   mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
   PRG: preliminary remediation goal

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

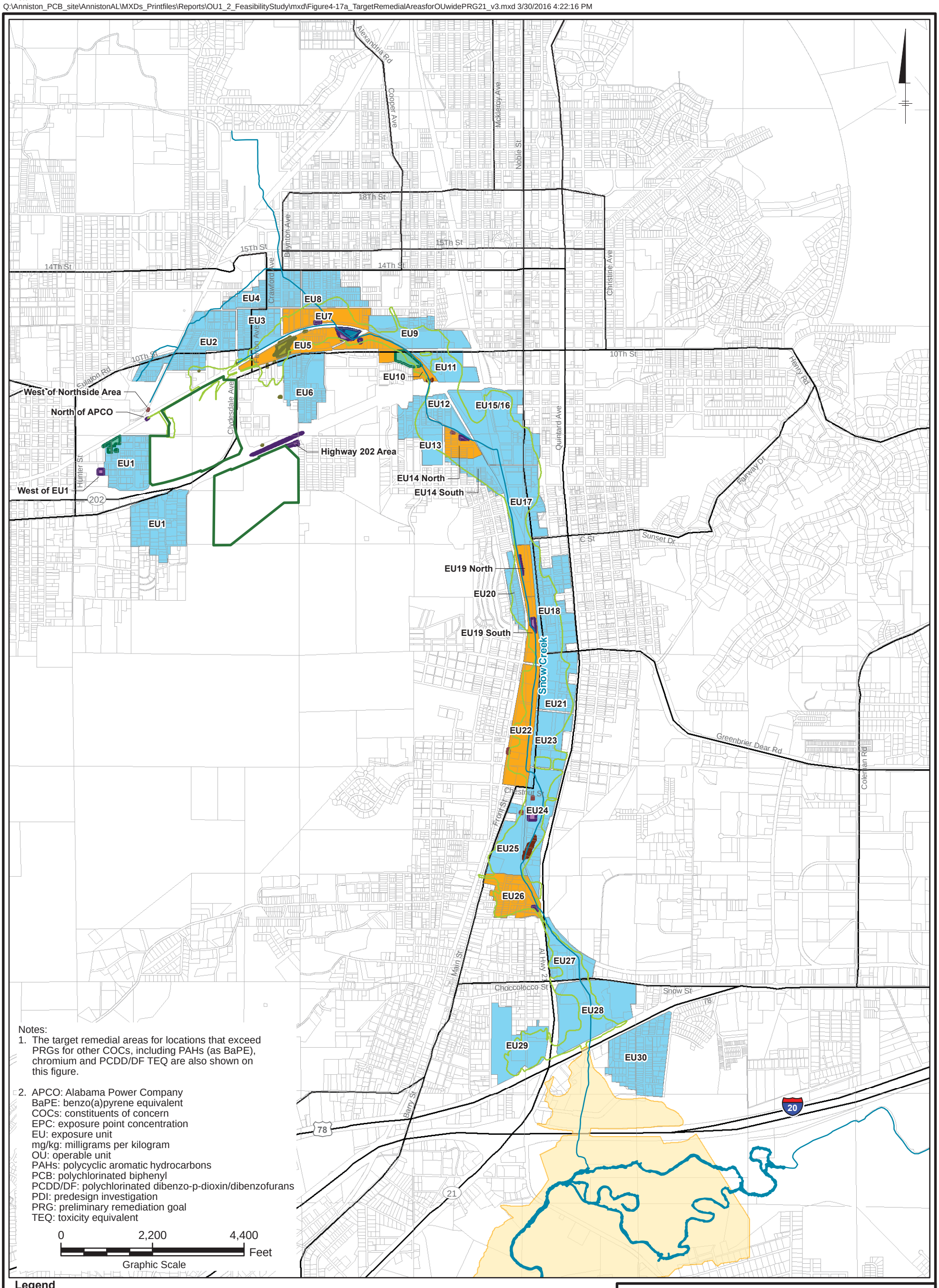
OU-1/OU-2 Remedial Design Work Plan

Dredge Spoil Piles

Solutia

Figure
2-4

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: kives
Anniston
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-17a_TargetRemedialAreasforOUwidePRG21_v3.mxd 3/30/2016 4:22:16 PM



Notes:
1. The target remedial areas for locations that exceed PRGs for other COCs, including PAHs (as BaPE), chromium and PCDD/DF TEQ are also shown on this figure.

2. APCO: Alabama Power Company
BaPE: benzo(a)pyrene equivalent
COCs: constituents of concern
EPC: exposure point concentration
EU: exposure unit
mg/kg: milligrams per kilogram
OU: operable unit
PAHs: polycyclic aromatic hydrocarbons
PCB: polychlorinated biphenyl
PCDD/DF: polychlorinated dibenzo-p-dioxin/dibenzofurans
PDI: predesign investigation
PRG: preliminary remediation goal
TEQ: toxicity equivalent

0 2,200 4,400 Feet
Graphic Scale

Legend

- Creek
- Major Roads
- OU-3 Boundary
- OU-4 100-Year Floodplain
- OU-1/OU-2 Downgradient Floodplain
- Parcels
- Exposure Unit with PCB EPC < 21 mg/kg or a maximum PCB concentration < 50 mg/kg
- EU with PCB EPC ≥ 21 mg/kg or a maximum PCB concentration ≥ 50 mg/kg
- Interim Measures Expansion Area
- Target Remedial Area
- Target Remedial Area for PCBs
- Unapproved Waste Disposal Area
- Dredge Spoil Pile
- Target Remedial Areas for Other COCs -

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama
OU-1/OU-2 Remedial Design Work Plan

Nonresidential Surface Soil with a PCB PRG of 21 mg/kg

Solutia

Figure
2-5

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-22AtoJ_SnowCreek_SedimentDeposits_WithData1.mxd 3/28/2016 8:44:17 AM

S-1-01		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10021	0-2	3.8
S10022	2-8	31

S-1-02		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10023	0-2	8.0

S-1-04		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10024	0-2	14
S10025	2-5	17

S-1-05		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10026	0-2	11

S-1-07		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10027	0-2	16
S10028	2-12	1.2
S10029	12-23	ND

S-1-08		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10030	0-2	32
S10031	2-12	12
S10032 [duplicate]	2-12	4.3
S10033	12-14.5	37

S-1-10		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10034	0-2	12
S10035	2-12	29
S10036	12-16.5	18

S-1-11a		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10037	0-2	2.2
S10038	2-12	ND
S10039	12-24	0.39

S-1-11b		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10040	0-2.5	12

S-1-12		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10041	0-2	0.67
S10042	2-5	2.1

S-1-01 S-1-02 S-1-03 S-1-04 S-1-05 S-1-06 S-1-07 S-1-08 S-1-09 S-1-10 S-1-11A S-1-11B S-1-12 S-1-13 S-1-14

Figure 2-6a
Figure 2-6b
Figure 2-6c
Figure 2-6d
Figure 2-6e
Figure 2-6f
Figure 2-6g
Figure 2-6h
Figure 2-6i
Figure 2-6j
202
78

Legend

- Sediment Sample Location
- Engineered Bank Stability Measures
- Natural Bank Stability Measures
- 11th Street Ditch
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain

Sediment Deposit
Average PCB Concentration (mg/kg)
- < 3
- ≥ 3 and < 10
- ≥ 10

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 4)
- ≥ 10

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Sediment sample locations are approximate.
3. Snow Creek deposits are based on field probing conducted in 1999.
4. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
5. in: inches
   mg/kg: milligram per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl
   PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Remedial Design Work Plan

Snow Creek Sediment Deposits and Targeted Creek Bank Stability Areas

Solutia

Figure 2-6a

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-22AtoJ_SnowCreek_SedimentDeposits_WithData1.mxd 3/28/2016 8:39:36 AM

S-1-16		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10043	0-2	28
S10044	2-5	32

SED-A09		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
SED-A9	0-3	7.8

S-1-14
S-1-15
S-1-16
S-1-17
S-2

Figure 2-6a
Figure 2-6b
Figure 2-6c
Figure 2-6d
Figure 2-6e
Figure 2-6f
Figure 2-6g
Figure 2-6h
Figure 2-6i
Figure 2-6j
202
78

Legend

- Sediment Sample Location
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain
- Sediment Deposit Average PCB Concentration (mg/kg) ≥ 10
- Sediment Deposit Estimated PCB Concentration (mg/kg) (see Note 4) ≥ 10

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Sediment sample locations are approximate.
3. Snow Creek deposits are based on field probing conducted in 1999.
4. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
5. in: inches
   mg/kg: milligram per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
   PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Remedial Design Work Plan

Snow Creek Sediment Deposits and Targeted Creek Bank Stability Areas

Solutia

Figure
2-6b

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
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S-1-17

CP-C-9		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
CP-C-9-0-4"	0-4	2.0

S-2-02		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10045	0-3.5	19

CP-C-10		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
CP-C-10-0-2"	0-2	2.9
CP-C-10-2-6"	2-6	3.6
CP-C-10-6-12"	6-12	12

SED-A10		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
SED-A10	0-3	6.9

CP-C-11		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
CP-C-11-0-2"	0-2	1.6
CP-C-11-2-6"	2-6	1.2
CP-C-11-6-12"	6-12	7.5

S-2-03a		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10046	0-3	3.8

S-2-05		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10048	0-2	5.4
S10049	2-5	6.4

S-MED-1		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10134	0-8	60

S-2-06A		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10060	0-2	22
S10061	2-5	8.9

S-HIGH-1		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10135	0-18	4.2
S10137 [duplicate]	0-18	2.3

S-2-06B		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10053	0-2	13
S10054	2-12	11
S10055	12-20.5	34
S10131 [duplicate]	12-20.5	60

S-2-08		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10050	0-2	20
S10051	2-12	20
S10052	12-16	4.0

S-2-06C		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10056	0-2	30
S10057	2-12	14
S10058	12-24	23
S10059	24-27	15

SED-A11		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
SED-A11	0-3	16

PECON-011		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
PECON-011	0-3	4.3

PECON-012		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
PECON-012	0-3	8.5

S-2-01
S-2-02
S-2-3B
S-2-3A
S-2-4A
S-2-4B
S-2-05
S-2-06
S-2-07
S-2-08
S-2-09
S-2-10
S-2-11
S-2-12
S-2-13
S-2-14

Figure 2-6a
Figure 2-6b
Figure 2-6c
Figure 2-6d
Figure 2-6e
Figure 2-6f
Figure 2-6g
Figure 2-6h
Figure 2-6i
Figure 2-6j
202
78

Legend

- Sediment Sample Location
- Natural Bank Stability Measures
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain
- Deposit with Metals Exceedance and PCB < 10 mg/kg

Sediment Deposit
Average PCB Concentration (mg/kg)
- ≥ 3 and < 10
- ≥ 10

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 4)
- ≥ 3 and < 10
- ≥ 10

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Sediment sample locations are approximate.
3. Snow Creek deposits are based on field probing conducted in 1999.
4. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
5. in: inches
   mg/kg: milligram per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
   PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Remedial Design Work Plan

Snow Creek Sediment Deposits and Targeted Creek Bank Stability Areas

Solutia

Figure
2-6c

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
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S-3-01		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10064	0-2	3.3
S10065	2-8	4.8

SED-A12		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
SED-A12	0-3	3.9

S-3-05		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10069	0-2	1.4
S10070	2-10.5	2.1

S-2-16		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10062	0-2	4.0
S10063	2-4	3.3

S-3-02		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10066	0-2	8.1
S10067	2-12	11
S10068	12-15.5	17

S-3-07		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10071	0-2	0.66
S10072	2-8	0.76

S-2-15
S-2-16
S-3-01
S-3-02
S-3-03
S-3-04
S-3-05
S-3-06
S-3-07

Figure 2-6a
Figure 2-6b
Figure 2-6c
Figure 2-6d
Figure 2-6e
Figure 2-6f
Figure 2-6g
Figure 2-6h
Figure 2-6i
Figure 2-6j
202
78

Legend

- Sediment Sample Location
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain

Sediment Deposit
Average PCB Concentration (mg/kg)
- < 3
- ≥ 3 and < 10
- ≥ 10

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 4)
- < 3
- ≥ 3 and < 10

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Sediment sample locations are approximate.
3. Snow Creek deposits are based on field probing conducted in 1999.
4. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
5. in: inches
   mg/kg: milligram per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
   PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Remedial Design Work Plan

Snow Creek Sediment Deposits and Targeted Creek Bank Stability Areas

Solutia

Figure
2-6d

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
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S-4-02		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10073	0-2	1.1
S10074	2-4	0.58

Legend

- Sediment Sample Location
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain

Sediment Deposit
Average PCB Concentration (mg/kg)
< 3

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 4)
< 3

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Sediment sample locations are approximate.
3. Snow Creek deposits are based on field probing conducted in 1999.
4. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
5. in: inches
   mg/kg: milligram per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
   PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Remedial Design Work Plan

Snow Creek Sediment Deposits and Targeted Creek Bank Stability Areas

Solutia

Figure
2-6e

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-22AtoJ_SnowCreek_SedimentDeposits_WithData1.mxd 3/28/2016 8:44:17 AM

Legend

- Snow Creek
- OU-1/OU-2 Downgradient Floodplain

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. OU: operable unit
   PCB: polychlorinated biphenyl
   PRG: preliminary remediation goal
3. No remedial areas shown on this figure. Figure included to provide complete view of Snow Creek.

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Remedial Design Work Plan

Snow Creek Sediment Deposits and Targeted Creek Bank Stability Areas

Solutia

Figure
2-6f

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
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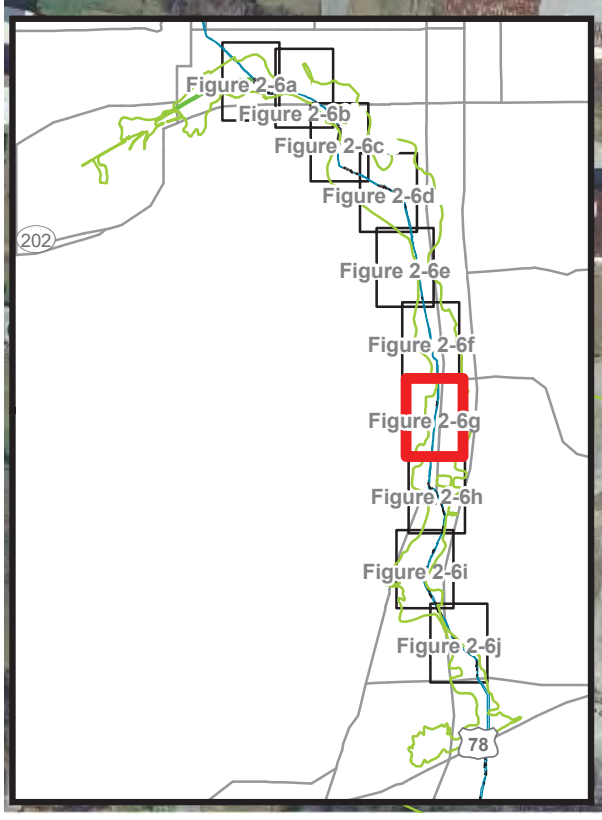
S-5-01		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10075	0-3.5	0.65
S10076 [duplicate]	0-3.5	0.76

S-5-01



Legend

- Sediment Sample Location
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain

Sediment Deposit
Average PCB Concentration (mg/kg)
- < 3

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Sediment sample locations are approximate.
3. Snow Creek deposits are based on field probing conducted in 1999.
4. in: inches
   mg/kg: milligram per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
   PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Remedial Design Work Plan

Snow Creek Sediment Deposits and Targeted Creek Bank Stability Areas

Solutia

Figure
2-6g

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
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S-5-02		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10077	0-3.5	4.5

S-5-03		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10078	0-2	5.8
S10079	2-4	1.6

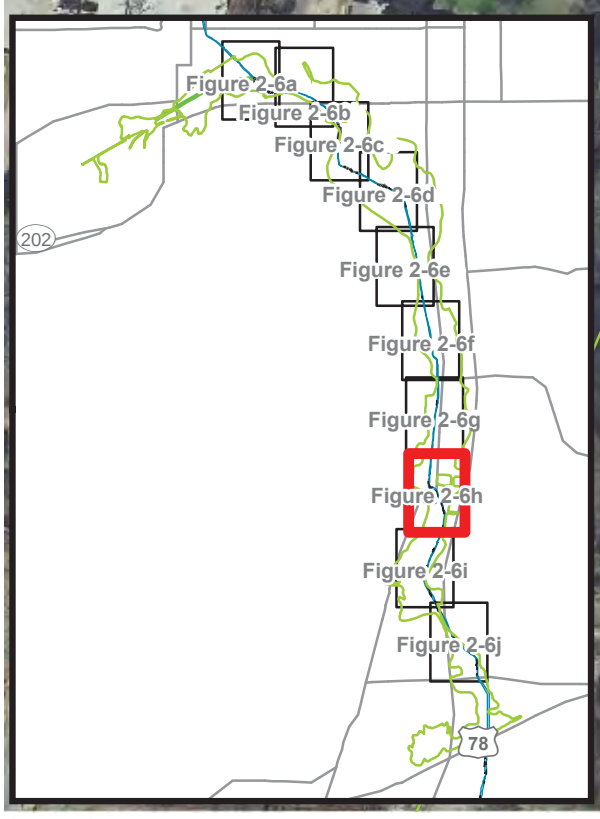
S-LOW-1		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10136	0-6	1.7

S-5-04		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10080	0-2	1.8
S10081	2-6	1.9

S-5-05		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10082	0-2	1.2
S10083	2-4	1.9

S-5-06		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10084	0-2	2.7
S10085	2-5	2.3

S-5-03
S-5-04
S-5-05
S-5-06
S-5-07
S-5-08A
S-5-08B



Legend

- Sediment Sample Location
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain
- Deposit with Metals Exceedance and PCB < 3 mg/kg

Sediment Deposit
Average PCB Concentration (mg/kg)
- < 3
- ≥ 3 and < 10

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 4)
- < 3

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Sediment sample locations are approximate.
3. Snow Creek deposits are based on field probing conducted in 1999.
4. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
5. in: inches
   mg/kg: milligram per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
   PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Remedial Design Work Plan

Snow Creek Sediment Deposits and Targeted Creek Bank Stability Areas

Solutia

Figure
2-6h

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
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S-5-08B

S-5-9

PECON-020		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
PECON-020	0-3	0.75

S-5-10

S-5-11A
S-5-11B

S-5-12A

S-5-12B

CA-25-9999-90		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
PCWASTE-004-A	0-3	11
S70746	6-12	0.76

FE2-001-C		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
FE2-001-C	0-3	2.5

FE2-001-A		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
FE2-001-A	0-3	0.90

S-5-13		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10086	0-3.5	1.3

S-5-13

S-5-14A		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10087	0-2	1.5
S10088	2-5	0.92

S-5-14B		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10089	0-2	1.6
S10090	2-5.5	1.6

S-5-14

PCWaste-004-B		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
PCWaste-004-B	0-3	1.2

S-5-15

S-5-16

Figure 2-6a
Figure 2-6b
Figure 2-6c
Figure 2-6d
Figure 2-6e
Figure 2-6f
Figure 2-6g
Figure 2-6h
Figure 2-6i
Figure 2-6j
202
78

Legend

- Sediment Sample Location
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain
- Deposit with Metals Exceedance and PCB < 3 mg/kg

Sediment Deposit
Average PCB Concentration (mg/kg)
- < 3

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 4)
- < 3
- ≥ 3 and < 10

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Sediment sample locations are approximate.
3. Snow Creek deposits are based on field probing conducted in 1999.
4. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
5. in: inches
   mg/kg: milligram per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
   PRG: preliminary remediation goal

0 150 300
Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Remedial Design Work Plan

Snow Creek Sediment Deposits and Targeted Creek Bank Stability Areas

Solutia

Figure
2-6i

City: SYR Div/Group: SWG Created By: KIVES Last Saved By: jbistrovich
ANNISTON
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-22AtoJ_SnowCreek_SedimentDeposits_WithData1.mxd 3/28/2016 8:44:17 AM

S-5-24		
Sample Name	Depth Interval (in)	Total PCB (mg/kg)
S10091	0-2	1.2
S10092	2-12	1.2

Legend

- Sediment Sample Location
- Snow Creek
- OU-1/OU-2 Downgradient Floodplain

Sediment Deposit
Average PCB Concentration (mg/kg)
< 3

Sediment Deposit
Estimated PCB Concentration (mg/kg) (see Note 4)
< 3

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Sediment sample locations are approximate.
3. Snow Creek deposits are based on field probing conducted in 1999.
4. Estimated PCB concentrations for sediment deposits with no sampling data were interpreted based on PCB data for nearby sediment samples.
5. in: inches
   mg/kg: milligram per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
   PRG: preliminary remediation goal

0 150 300 Feet
Graphic Scale

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama

OU-1/OU-2 Remedial Design Work Plan

Snow Creek Sediment Deposits and Targeted Creek Bank Stability Areas

Solutia

Figure
2-6j

Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND to < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500
- ≥ 500

- Analytes other than PCB and Lead Analyzed
- 11th Street Ditch
- Exposure Unit
- Parcel Boundaries
- Completed Removal Area
- Residential < 1 (mg/kg)
- OU-1/OU-2 Downgradient Floodplain
- Interim Measure and Other Early Actions
- Special Use: High Activity Area
- Special Use: Low Activity Area ≥ 1 mg/kg
- Interim Measures Expansion Area
- Locations with Maximum PCB Results ≥ 500 mg/kg
- Locations Beneath Cover System with Maximum PCB Results ≥ 500 mg/kg

0 100 200 Feet
Graphic Scale

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl

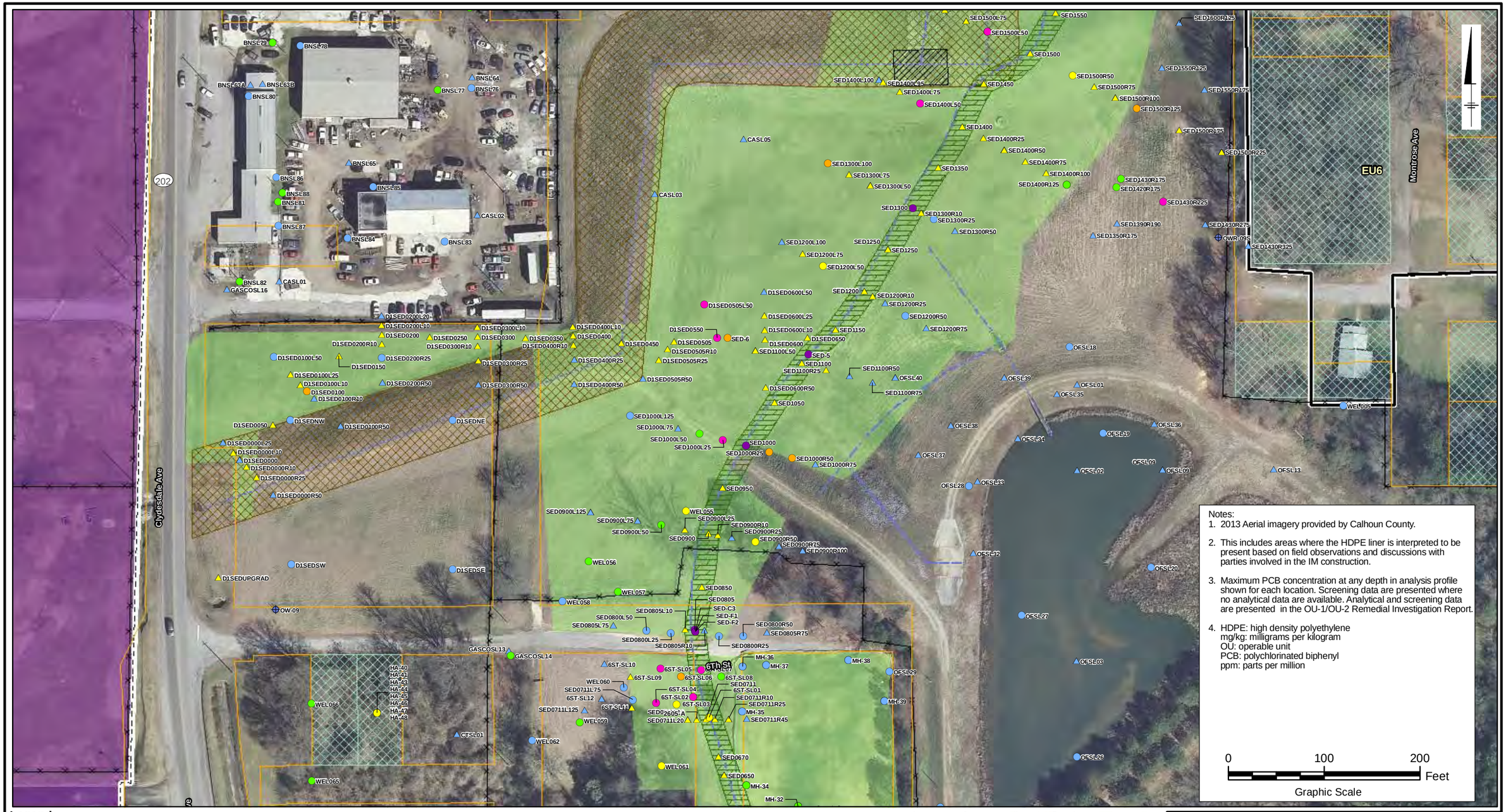
Anniston PCB Site: OU-1/OU-2
Anniston, Alabama
OU-1/OU-2 Remedial Design Work Plan

Eastside Drainage Way: Remedial Areas

Solutia

Figure
3-1

City: SYR Div/Group: SWG Created By: K.IVES Last Saved By: jbistrovich
Anniston
Q:\Anniston_PCB_site\AnnistonALL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-8_EastsideDrainageWay_CandidateRemedialAreas.mxd 3/25/2016 3:10:01 PM



Legend

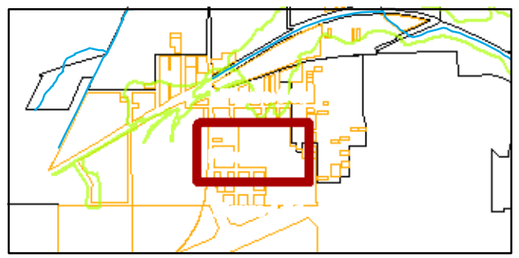
Total PCB Aroclor Concentration in Soil (mg/kg) (See Note 3)

- <1 (Including nondetects)
- ≥1 to <10
- ≥10 to <25
- ≥25 to <50
- ≥50 to <500
- ≥500
- Active Groundwater Monitoring Well

Total PCB Screening Result (Immunoassay) (ppm) (See Note 3)

- < 1; < 5; < 10
- > 10; > 25
- Fence

- DrainageDitch
- Storm Water Piping
- Exposure Unit
- Solutia-Owned Parcels
- Berm
- Emergency Spillway Soil-HDPE Geomembrane Liner (See Note 2)
- OU-3 Boundary
- Soil-Geotextile Cover
- Northside Area Boundary



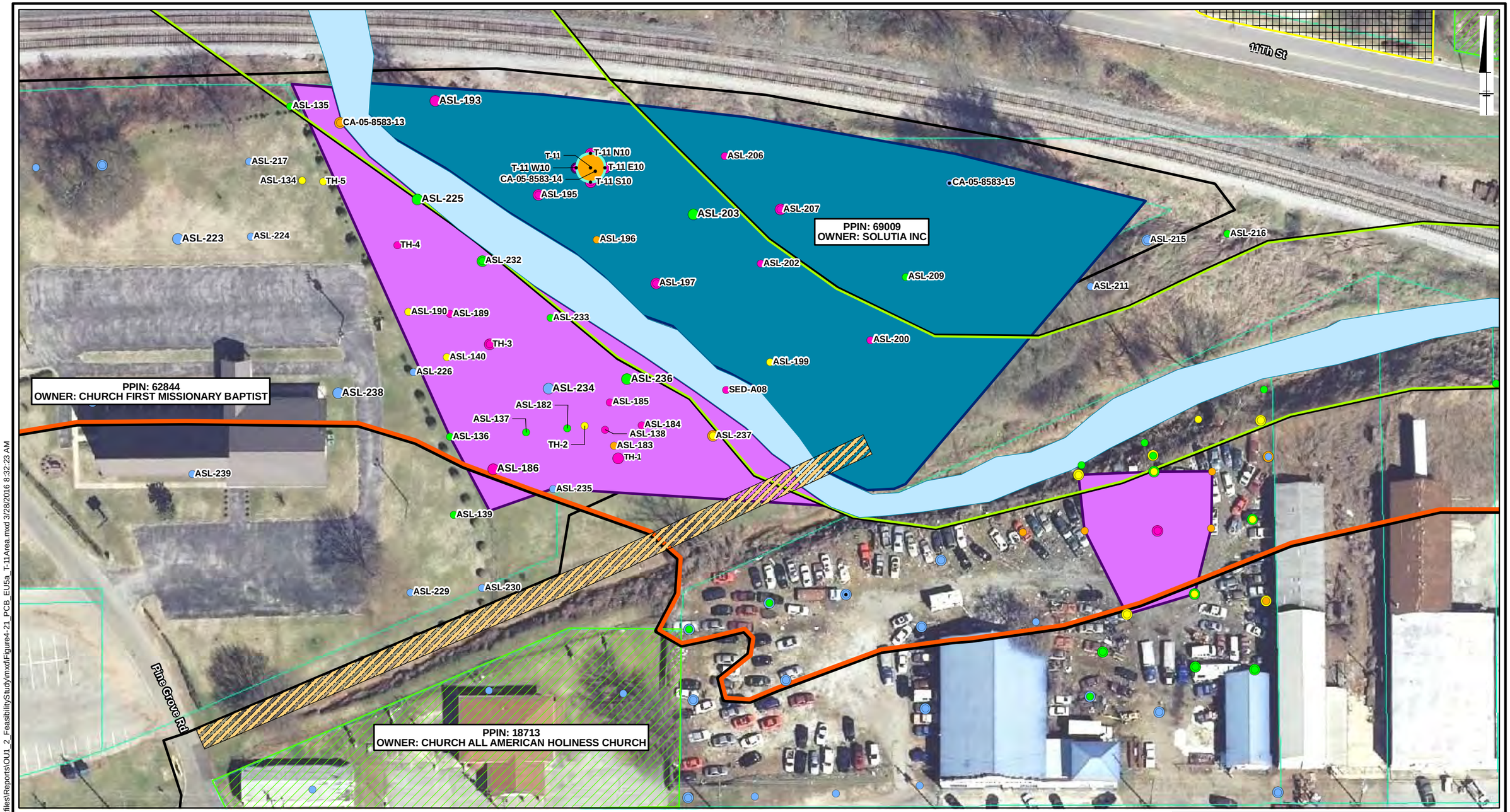
Anniston PCB Site: OU-1/OU-2
Anniston, Alabama
OU-1/OU-2 Remedial Design Work Plan

Eastside Properties: Previously Implemented Interim Measures

Solutia

Figure
3-2

City: SYR Div/Group: SWG Created By: KJves Last Saved By: jbistrovich
Anniston
Q:\Anniston_PCB_site\AnnistonALL\MXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-5BtoD_InterimMeasures_PCB_Eastside_MapBook_v2.mxd 3/24/2016 8:55:14 AM



City: SYR Div/Group: SWG Created By: K.IVES Last Saved By: jbistrovich
Anniston
Q:\Anniston_PCB_site\Anniston\ALLMXDs_Printfiles\Reports\OU1_2_FeasibilityStudy\mxd\Figure4-21_PCB_EU5a_T-11Area.mxd 3/28/2016 8:32:23 AM

Legend

Soil Sample Location
Surface PCB (mg/kg)
- ND or < 1
- ≥ 1 or <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500

- Snow Creek
- Analytes other than PCB and Lead Analyzed
- Potential Access Road
- Exposure Unit
- FEMA Floodway
- OU-1/OU-2 Downgradient Floodplain

- Parcel Boundaries
- Completed Removal Area
- Residential < 1 (mg/kg)
- Principal Threat Waste Area
- NRS Target Remedial Area
- GW Target Remedial Area

0 75 150 Feet
Graphic Scale

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Notes:
1. 2013 Aerial imagery provided by Calhoun County.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. Bridge location is not finalized.
5. FEMA: Federal Emergency Management Agency
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl
PPIN: Property Parcel Identification Number

Anniston PCB Site: OU-1/OU-2
Anniston, Alabama
OU-1/OU-2 Remedial Design Work Plan

Target Remedial Area in Exposure Unit 5 - T-11 Area

Solutia

Figure
3-3

APPENDIX A
Health and Safety Plan

OU-1/OU-2 Remedial Design/Remedial Action Health and Safety Plan

Revision 0

Anniston, Alabama

Pharmacia LLC/Solutia Inc.

702 Clydesdale Avenue
Anniston, AL 36201

August 2021

EMERGENCY AND NONEMERGENCY CONTACTS

EMERGENCY	
Fire	911
Police	911
Ambulance	911
NONEMERGENCY	
Anniston Fire	(256) 231-7647
Anniston Police (and animal control)	(256) 238-1800
City of Oxford Police	(256) 831-3121
City of Oxford Fire	(256) 831-3208
Calhoun County Sheriff's Office	(256) 237-4731
Calhoun County Animal Control (Cheaha Regional Humane Society)	(256) 241-3647
Talladega County Sheriff's Office	(256) 362-2748
HOSPITALS: Regional Medical Center, 400 East 10th Street, Anniston, AL 36207 St Vincent's St. Clair, 7063 Veterans Pkwy, Pell City, AL 35125	(256) 235-5121 (205) 338-3301
Alabama One Call	811
Poison Control Center	(800) 222-1222
National Response Center (chemical or oil spill)	(800) 424-8802
USEPA Project Manager (Pam Scully)	(404) 562-8935
USEPA Region 4 Section Chief (Derek Matory)	(404) 562-8800
Solutia Anniston PCB Site Manager (Gayle Macolly)	(256) 231-8404

PCB: polychlorinated biphenyl
USEPA: United States Environmental Protection Agency

TABLE OF CONTENTS

TABLES (included in text)

FIGURES

ATTACHMENT A: HEALTH AND SAFETY FORMS (pdf and editable Microsoft Word files included for field use)

ATTACHMENT B: HEALTH AND SAFETY PROCEDURES (a single pdf and Microsoft Word versions of forms associated with health and safety procedures are included)

HS 118 Confined Space Entry Program

HS 119 Lockout/Tagout Program

HS 120 Fall Protection Program

HS 128 Ionizing and Nonionizing Radiation Safety

HS 132 Competent Persons

HS 134 Compressed Gases

HS 203 Stop Work Authority

HS 210 Walking-Working Surfaces Protection

HS 306 Working on or Near Water and Ice

HS 312 Water Transportation Safety

HS 401 Manual Materials Handling/Back Injury Prevention

HS 402 Excavation and Trenching

HS 404 Handling Drums and Large Containers

HS 502 Manual Hand Tools

HS 503 Powered Hand Tools

HS 504 Heavy Equipment

HS 505 Safe Operation of Forklifts

HS 508 Fire Extinguishers and Suppression Systems

HS 509 Manlifts and Aerial Lifts

HS 510 All-Terrain Vehicles

HS 511 Welding, Cutting, and Other Hot Work

HS 517 Traffic Safety

CDC Fact Sheet on Ticks

ATTACHMENT C: PCB INFORMATION TABLE AND SAFETY DATA SHEETS

PCB Chemical Hazard Information

PCBs in Soil

Ethyl Parathion Safety Data Sheet

4-Nitrophenol Safety Data Sheet

ACRONYMS AND ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
ANSI	American National Standards Institute
APR	air-purifying respirator
CFR	Code of Federal Regulations
CO	carbon monoxide
COC	constituent of concern
CP	competent person
CPR	cardiopulmonary resuscitation
CRZ	contamination-reduction zone
dBA	A-weighted decibels
DEET	diethyltoluamide
EAR	expired air resuscitation
ECT	equivalent chill temperature
EMS	emergency medical services
EZ	exclusion zone
°F	degrees Fahrenheit
Facility	Anniston Plant (OU-3 of the Anniston PCB Site)
FM	Factory Mutual Engineering Corporation
GIS	geographical information system
HASP	health and safety plan
HAZWOPER	Hazardous Waste Operations Emergency and Response
HBV	hepatitis B virus
HIV	human immunodeficiency virus
JSA	job safety analysis
kV	kilovolts
LEL	lower explosive limit
LO/TO	lockout/tagout
mph	miles per hour
NaCl	sodium chloride
NEC	National Electrical Code
NESC	National Electrical Safety Code
NIOSH	National Institute for Occupational Safety and Health NTC Removal
NRR	noise reduction rating
OSHA	Occupational Safety and Health Administration

OU	operable unit
PCB	polychlorinated biphenyl
PEL	permissible exposure limit
PID	photoionization detector
PFD	personal flotation device
PPE	personal protective equipment
ppm	parts per million
P/S	Pharmacia LLC and Solutia Inc.
psi	pounds per square inch
PVC	polyvinyl chloride
RA	remedial action
RD	remedial design
RDWP	remedial design work plan
ROD	Record of Decision
SCBA	self-contained breathing apparatus
SDS	safety data sheet
Site	Anniston PCB Site
SSO	Site safety officer
Swann	Swann Chemical Company
SWO	safe work observation
SZ	support zone
ta adj	adjusted air temperature
TLV	threshold limit value
UL	Underwriters Laboratory
US	United States
USCG	United States Coast Guard
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

1. INTRODUCTION

This Operable Unit 1/Operable Unit 2 remedial design/remedial action health and safety plan (OU-1/OU-2 RD/RA HASP) has been developed to support the RD/RA for the OU-1/OU-2 portion of the Anniston polychlorinated biphenyl (PCB) Site (the Site). The RD/RA activities are being conducted on behalf of Pharmacia LLC/Solutia Inc (P/S) to implement work identified in the OU-1/OU-2 RD/RA Consent Decree (CD). The CD presents the work that P/S are conducting for portions of the remedies identified in the OU-1/OU-2 Record of Decision (ROD) (USEPA 2017).

The Site includes residential, commercial/industrial, and public properties located in and around Anniston, Oxford, Hobson City, and areas of Calhoun and Talladega Counties in Alabama (Figure 1). The Site has been investigated for over 20 years, including for the potential presence of PCBs and other chemical constituents in various environmental media. The Site is currently divided into multiple OUs (Figure 1) and OU-1/OU-2 is a combination of what was originally two OUs representing residential properties (OU-1) and nonresidential properties (OU-2) around the facility currently owned by Solutia Inc., a wholly owned subsidiary of Eastman Chemical Company, and downstream along Snow Creek to Highway 78. OU-3 is Solutia's Anniston Facility (the Facility) and its adjacent closed landfills: the South Landfill and the West End Landfill. OU-4 is Choccolocco Creek and its floodplains from its confluence with Snow Creek up to Highway 78 to its discharge at the embayment of Lake Logan Martin on the Coosa River. The Site is not on the Superfund National Priorities List; it is being addressed through the Superfund Alternative Approach. The Superfund site identification number is ALD000400123.

The OU-1/OU-2 RD/RA HASP is applicable to personnel working on or in association with work being conducted under the CD and is a supporting deliverable to the Remedial Design Work Plan (RDWP) and is required under the Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations Emergency and Response (HAZWOPER) program per 29 Code of Federal Regulations (CFR) 1910.120 and 1926. This OU-1/OU-2 RD/RA HASP is intended to include the activities and procedures to be conducted during the RD/RA and additional activities that may be required in the future. Health and safety procedures have been organized to be hazard specific rather than task specific (i.e., the same hazard may be associated with several tasks), and a Job Safety Analysis (JSA) process (Section 3.2) is included to address situations where multiple hazards might be associated with a given task.

This OU-1/OU-2 RD/RA HASP provides the framework and flexibility for additional activities to be addressed by preparing an individual JSA for each task and/or updating this plan, if needed. The OU-1/OU-2 RD/RA HASP will be updated to cover activities during the RA and updated to cover activities after RA completion in accordance with the CD. The HASP provides a mechanism for establishing safe working conditions at the Site. The safety organization, procedures, and protective equipment have been established based on an analysis of potential hazards. Specific hazard control methods have been evaluated and selected to minimize the potential of injury, illness, or damage to property.

1.1 Background

This section summarizes information regarding the Site and the surrounding areas. Section 1.1.1 describes the Site including the various OUs, and a history of the Facility (OU-3) is provided in Section 1.1.2. Additional information regarding OU-1/OU-2 and the Site information is compiled in the OU-1/OU-2 Remedial Investigation Report (ENVIRON 2015), the OU-1/OU-2 Feasibility Study Report (Ramboll Environ 2016), and the OU-1/OU-2 ROD (USEPA 2017).

1.1.1 Site Description

The Site is currently organized into four Operable Units—OU-1, OU-2, OU-3, and OU-4—and consists of both residential and nonresidential properties upstream of Highway 78 (OU-1/OU-2) up to and surrounding the Facility (OU-3). The lateral study bounds for OU-1/OU-2 were established based on the limits of the Snow Creek 100-year floodplain and drainage areas downstream of the 11th Street Ditch (Figure 1) recognizing that some residential removal activities took place outside of Snow Creek's 100-year floodplain.

The geographic footprint for the studies in OU-1/OU-2 was generally guided by the potential source, release mechanism, and migration pathway for PCBs from OU-3. With PCB-containing materials as the primary source of the off-site migration of PCBs from OU-3, the associated release mechanism was overland surface water runoff during and following periods of heavy precipitation. Overland surface water runoff and other discharges potentially carried PCB-containing materials from OU-3 to the 11th Street Ditch. Surface water flow along the 11th Street Ditch could transport these sediment-bound PCBs downstream along Snow Creek. During periods of high flow, out-of-bank flooding carried PCB-containing materials into the adjoining floodplain areas.

OU-4 is the most geographically expansive of the OUs and includes approximately 35 miles of Snow and Choccolocco Creeks and 6,000 acres of floodplain. OU-4 includes the lower end of Snow Creek and its floodplain from downstream of Highway 78 to the confluence of Snow and Choccolocco Creeks and Choccolocco Creek and its floodplain from the backwater area upstream of the Snow Creek confluence downstream to Lake Logan Martin. The downstream portion of Snow Creek is more characteristic of Choccolocco Creek than the upper reaches of Snow Creek, and, hence, it has been included in OU-4.

1.1.2 Facility History

In approximately 1917, Southern Manganese Corporation began manufacturing ferro-manganese, ferro-silicon, and ferro-phosphorous compounds and, later, phosphoric acid at the Facility. In 1927, Southern Manganese Corporation began producing organic chemicals with the introduction of biphenyl, which remains a major product of the Facility. In 1930, Southern Manganese Corporation became Swann Chemical Company (Swann). Monsanto Chemical Company (now known as Pharmacia LLC) purchased Swann in May 1935. In 1997, Monsanto Company spun-off Solutia Inc. as an independent company. In 2012, Solutia Inc. was acquired by Eastman Chemical Company. Solutia Inc. is a wholly owned subsidiary of Eastman Chemical Company.

A variety of organic and inorganic chemicals, including PCBs, have been produced at the Facility during its history. The Facility currently manufactures polyphenyl compounds, which are used in

a variety of heat-transfer fluid, plasticizer, and lubricant applications. PCBs were produced at the Facility from the late 1920s to 1971 by reacting chlorine and biphenyl. Chlorine was also produced at the Facility between the 1950s and 1969 for the sole purpose of supporting PCB manufacturing.

1.2 Policy Statement

Work activities will be carried out in a manner that protects the safety and health of all workers and, where applicable, the public. The basic provisions of this plan are mandatory for all personnel. In addition, all visitors (e.g., equipment and material delivery personnel, non-subcontractors, government agencies [USEPA]) must abide by the requirements of this plan.

This OU-1/OU-2 RD/RA HASP provides general health and safety information regarding Site conditions and pertinent activities. Subcontractors who are hired to carry out activities supporting the RD/RA are required to work under this OU-1/OU-2 RD/RA HASP, or they might be required to develop their own HASP. When applicable, the subcontractor's HASP will be specific to OU-1/OU-2 and the task(s) that the subcontractor will be conducting. All subcontractor-specific HASPs must also comply with the requirements of this OU-1/OU-2 RD/RA HASP and will be distributed and kept on file electronically.

The general safety procedures and protective equipment requirement presented in this general OU-1/OU-2 RD/RA HASP have been established based on an analysis of potential physical, chemical, and biological hazards. The hazard control methods presented are intended to minimize the potential for accident or injury. This HASP prescribes the procedures that must be followed during activities at the Site. Operational changes that could affect the health and safety of personnel, the community, or the environment will not be made without prior approval of the Project Manager and the Site Safety Officer (SSO). This document will be reviewed periodically to confirm that it is current and technically correct. Changes in conditions at the OU-1/OU-2 work area or the scope of work may require reviewing and modifying this OU-1/OU-2 RD/RA HASP. Such modifications will be completed in the form of an addendum or a revision to the HASP.

1.3 HASP Organization

This OU-1/OU-2 RD/RA HASP is written in 11 sections and has 3 attachments:

- This first section (Section 1) provides the introduction, a Site description and background, a policy statement, and this organization section.
- Section 2 discusses roles and responsibilities for the project.
- Sections 3 and 4 discuss general safety practices and general safety hazards and controls that are specifically anticipated for OU-1/OU-2, respectively. Section 3.2 discusses the JSA process that will be used for most tasks and activities.
- Section 5 discusses personal protective equipment (PPE) selection for various activities as well as respirator use, if needed.
- Sections 6 and 7 discuss the requirements for air and noise monitoring, respectively.

- Section 8 discusses the work zones that will be used, including decontamination procedures, for work in contaminated areas.
- Section 9 discusses regulatory and OU-1/OU-2 requirements for training and medical surveillance.
- Section 10 includes emergency procedures.
- Section 11 includes references included in preparation of this document.
- Attachment A includes the health and safety forms referred to in this document. Note that a Contractor may choose to use their own reporting forms, provided their forms capture the same information, are protective of OU-1/OU-2 workers, and are approved for use by the Project Manager and Corporate Safety Manager. Hard copy forms are attached to the hard copy version of this document. Additional Microsoft Word files are included with the electronic version of the HASP, for use by field personnel if they would prefer to complete the forms electronically.
- Attachment B includes health and safety procedures that may be needed, as is, or expanded on for future activities that may be conducted on OU-1/OU-2. The procedures presented in Attachment B have been included for use in developing task-specific JSAs. As such, not all of the procedures are specifically referred to in the body of the OU-1/OU-2 RD/RA HASP. Note that a subcontractor may choose to use their own procedures and reporting forms, provided their forms capture the same information and are protective of OU-1/OU-2 workers. Hard copy procedures, including relevant forms, are attached to the hard copy version of this document. Additional Microsoft Word® files of the relevant forms are included with the electronic version of the OU-1/OU-2 RD/RA HASP, for use by field personnel if they would prefer to complete the forms electronically.
- Attachment C includes a table summarizing chemical hazard information for PCBs and safety data sheets (SDSs) for PCBs, 4-nitrophenol, and ethyl parathion, as chemicals that might be encountered during field activities. In addition to a table with chemical hazard information for PCBs an SDS form for a laboratory standard of PCBs in soil is provided as an example of a likely scenario for on-site exposure. If during the preparation of the task-specific JSAs, additional SDSs are deemed appropriate, the additional SDS forms can be appended to the JSAs.

In early 2020, the US Centers for Disease Control (CDC) responded to a pandemic of respiratory disease that spreads through person-to-person contact. This disease is caused by a novel coronavirus termed “coronavirus disease 2019” (abbreviated “COVID-19”) that poses a serious public health risk. Guidelines from the CDC to protect workers from this disease or spreading this disease are provided at https://www.cdc.gov/coronavirus/2019-ncov/index.html. To the extent applicable, these CDC guidelines and applicable requirements from USEPA and the state or local public health authorities as well as any specific Eastman Chemical Company requirements should be incorporated into task-specific JSAs prepared for upcoming fieldwork or planning efforts for other project-related work.

2. ROLES AND RESPONSIBILITIES

P/S contractor and subcontractor personnel must adhere to the procedures outlined in this OU-1/OU-2 RD/RA HASP during the performance of their work. Each person is responsible for completing tasks safely and for reporting any unsafe acts or conditions to his or her supervisor or to others in management or in the health and safety organization. No person may work in a manner that conflicts with the procedures described in this plan. Per Section 2.4, all OU-1/OU-2 workers have the authority to stop work if a hazardous condition exists or if another OU-1/OU-2 worker is not complying with the proper health and safety procedures. After due warnings, any OU-1/OU-2 worker who violates safety procedures may be dismissed from the OU-1/OU-2 work area.

Contractors will provide personnel who are trained in accordance with applicable regulations and will be familiar with the requirements and procedures contained in this OU-1/OU-2 RD/RA HASP prior to initiating OU-1/OU-2 activities. Training will be documented for each individual by their employer. In addition, all personnel will attend an initial hazard briefing prior to beginning work at OU-1/OU-2 as well as daily safety meetings (Section 3.3). Any additional OU-1/OU-2- or task-specific training will be managed case by case and will be specified in the task specific JSA.

Any contractor or subcontractor conducting work at OU-1/OU-2 is responsible for protection and health and safety of their own employees, which may include using this document and the forms and procedures attached to this document. Alternatively, a subcontractor may choose to conduct work under their own HASP, which will meet or exceed the intent and requirements of this plan and its attachments. A subcontractor may use their own forms and procedures, if they provide the same level of protection for workers affected by the task. Any company that uses this document for field activities will acknowledge their understanding of the content of this OU-1/OU-2 RD/RA HASP with a signature on the acknowledgement form (Attachment A-1) and must clearly identify the lines of authority for health and safety within their organization and evaluate whether the health and safety procedures outlined in this HASP are appropriate for their activities. All field personnel operating under this OU-1/OU-2 RD/RA HASP will sign their acknowledgement on the Acknowledgement Form (Attachment A-1).

The health and safety roles, responsibilities, and lines of authority are described below. Compliance with this document will require that each contractor or subcontractor identify individuals for the roles of Project Manager, Field Operations Lead, SSO, and Corporate Safety Manager. One individual may be named to multiple roles. The names for these roles will be presented in the task-specific JSA and in the initial OU-1/OU-2 health and safety briefing to all on-site personnel working on that task. The individuals named in these roles can name a designee to conduct responsibilities in the named individual's absence. The name of the designee also needs to be documented in the task-specific JSA.

This OU-1/OU-2 RD/RA HASP and its attachments are intended to discuss potential hazards and how those hazards will be mitigated for anticipated RD/RA activities under the CD. For each specific activity, a JSA (Section 3.2) will be prepared and will reference, as appropriate, the specific procedures to be implemented to address potential hazards. If the JSA process identifies a

hazard that is not addressed in this plan or if an alternate approach provides a more effective mitigation for the hazard, the associated procedure(s) will be attached to the JSA and implemented for the work. If appropriate, this OU-1/OU-2 RD/RA HASP may be updated.

Use of this document also requires that a qualified SSO be present during all field activities to oversee implementation of this plan. To be qualified, an SSO (or designee) must have at least two years of field experience in health and safety at hazardous waste sites.

The following subsections describe the roles and responsibilities, especially relative to health and safety, on OU-1/OU-2, recognizing that P/S and multiple contractors will be working under this plan on varying tasks for the OU-1/OU-2 RD/RA project. For each task, it is expected that the individual contractors will provide different project teams depending on the expertise needed. Individuals on those teams may perform different roles relative to health and safety. For these reasons, individual names are not provided in this OU-1/OU-2 RD/RA HASP for each project role. Individuals will be named on the daily safety briefings logs.

Recognizing that several contractors and subcontractors will be working under this OU-1/OU-2 RD/RA HASP and that each contractor/subcontractor is responsible for certain training, documentation, reporting, and regulatory obligations under OSHA, this HASP is not intended to conflict or otherwise direct how individual corporations address these regulatory requirements (Section 2.1.3).

2.1 Health and Safety Leadership

The following describes the different leadership roles for the RD/RA project.

2.1.1 Anniston PCB Site Manager

The Anniston PCB Site Manager (P/S representative) has overall responsibility for projects associated with the Site and has final authority for decisions made by the contractors implementing the activities at the Site.

2.1.2 Project Manager

A Project Manager (or Task Manager) will be identified for each work activity. The Project Managers are responsible for providing resources to complete project activities in accordance with this OU-1/OU-2 RD/RA HASP and for meeting all regulatory and contractual requirements. The Project Managers are also responsible for confirming that the SSO has the equipment, materials, and qualified personnel to fully implement the safety requirements of this OU-1/OU-2 RD/RA HASP. It is also the responsibility of the managers to perform the following duties:

- Consult with the Corporate Safety Manager and SSO on OU-1/OU-2 health and safety issues.
- Verify that all incidents are thoroughly investigated.
- Approve, in writing, JSAs and addenda or revisions to OU-1/OU-2 RD/RA HASP.

2.1.3 Corporate Safety Manager

Each contractor and subcontractor conducting work on the OU-1/OU-2 will have a Corporate Safety Manager, responsible for implementing that company's health and safety programs and adhering to OU-1/OU-2 health and safety requirements. The Corporate Safety Manager is responsible for implementing and documenting those aspects of an OSHA-compliant health and safety program that are corporation specific (e.g., training, medical monitoring, respiratory protection).The Corporate Safety Manager (or designee) has overall responsibility for the technical health and safety aspects of their corporation's role on the project, including reviewing and acknowledging this OU-1/OU-2 RD/RA HASP (Attachment A-1). Inquiries regarding health and safety procedures, project procedures, and other technical or regulatory issues should be addressed to this individual. The Corporate Safety Manager (or designee) must acknowledge revisions or addenda to this OU-1/OU-2 RD/RA HASP.

The Corporate Safety Manager is also responsible for their individual corporate procedures for training, documentation, record keeping, and regulatory reporting in full accordance with OSHA and other regulatory requirements. All contractors and subcontractors will provide health and safety records and documentation of regulatory compliance to P/S upon request.

2.1.4 Field Operations Lead

The Field Operations Lead (or Site Supervisor) is the individual who is on-site during field work and is responsible for conducting the work in accordance with planning documents, this OU-1/OU-2 RD/RA HASP, and any associated JSAs. This individual, with the appropriate training, may also serve as the SSO. The Field Operations Lead is responsible for routine communications with OU-1/OU-2 workers and with project management and will participate in task- and safety-related planning, training, and implementation.

2.1.5 Site Safety Officer

The SSO (or designee) is responsible for field health and safety issues, including enforcing this OU-1/OU-2 RD/RA HASP and task-specific JSAs. Questions in the field regarding health and safety procedures, project procedures, and other technical or regulatory issues should be addressed to this individual. The SSO will advise the managers and supervisors on health and safety issues and will establish and coordinate the project's Competent Persons (CPs) program (Section 3.1). The SSO is the primary contact in the field for health and safety matters. The SSO is responsible for the following duties:

- Verify that personnel meet health and safety requirements prior to commencing work.
- Review the task-specific JSA with the field team to ensure the work will be conducted as safely as possible. Ensure that identified CPs and other identified personnel meet training and experience requirements and that PPE, air monitoring, and other requirements are implemented as intended to be protective of OU-1/OU-2 workers.
- Suspend work or modify work practices, as necessary, for personal safety, protection of property, and regulatory compliance.

- Provide technical assistance, if appropriate.
- Participate in all near miss and incident investigations and confirm they are reported to the Project Manager within 24 hours. Additional corporate and regulatory reporting may also be required, depending on the incident and its potential resolution.
- Coordinate personal air monitoring (as required) and maintain and calibrate equipment.
- Conduct safety orientation training and safety meetings.
- Verify that personnel have received the required physical examinations and medical certifications and that documentation is maintained in the project files.
- Review activities with respect to compliance with this OU-1/OU-2 RD/RA HASP and task-specific JSAs.
- Maintain required health and safety documents and records.
- Assist in instructing field personnel on project hazards and protective procedures.
- Stop work (as necessary) for personal safety, protection of property, and regulatory compliance.
- Notify local public emergency representatives (as appropriate) of the nature of the OU-1/OU-2 operations and ensure that their telephone numbers are included on the emergency contact list.
- Observe personnel for signs of ill-health effects.
- Investigate and report any incidents to the Project Manager.
- Verify that personnel have completed applicable training.
- Verify that personnel are informed of the physical, chemical, and biological hazards associated with the task activities and of the procedures and protective equipment necessary to control the hazards.
- Issue/obtain any required work permits (e.g., hot work).

2.1.6 Subcontractors

Subcontractors will be retained for their expertise in specific areas, and this expertise will include knowledge and ability to perform their tasks safely. Subcontractors and their personnel must understand and comply with applicable regulations and requirements established in this OU-1/OU-2 RD/RA HASP and in the task-specific JSA. For certain tasks, especially those requiring specialized skills or experience, subcontractors may choose to prepare and work under their own OU-1/OU-2 RD/RA HASP that is specific for the work they have been hired to perform. If documentation of activities is required, the subcontractor may use the forms attached to this OU-1/OU-2 RD/RA HASP or they may choose to use their own forms, provided that they meet the reporting intent discussed in this OU-1/OU-2 RD/RA HASP and in its attachments. Selection of subcontractors should include a review of their health and safety procedures and authorization to proceed will acknowledge which plan the subcontractor will work under. Each OU-1/OU-2 RD/RA HASP or task-specific JSA developed by a subcontractor must be consistent with (or more

stringent than) the requirements of this OU-1/OU-2 RD/RA HASP. Additionally, subcontractor JSAs developed for tasks being completed by a mixed project team should be compared for consistency with one another as well as this OU-1/OU-2 RD/RA HASP.

Subcontractor personnel will be trained in accordance with applicable regulations. Personnel will be familiar with the requirements and procedures contained in this OU-1/OU-2 RD/RA HASP or in their OU-1/OU-2 RD/RA HASP prior to initiating RD/RA work activities. Personnel will attend an initial hazard briefing prior to beginning work and will attend and participate in daily safety meetings. Communicating consistent governing health and safety procedures to a mixed project team should be done as a part of the daily safety briefings.

Depending on the complexity and breadth of their work, subcontractors will designate individuals to function as the Project Manager, Field Operations Lead, SSO, and Corporate Safety Manager.

2.2 Personnel

Personnel (including subcontractors) must read and acknowledge their understanding of the applicable documents (i.e., OU-1/OU-2 RD/RA HASP, task-specific JSAs, their approved OU-1/OU-2 RD/RA HASP [if applicable]) before commencing work and abide by the requirements described. All personnel must sign the Acknowledgement Form (Attachment A.1) or comparable form in their plan, after reviewing the applicable HASP and JSA.

Personnel will be trained in accordance with applicable regulations and be familiar with the requirements and procedures contained in the applicable HASP prior to initiating RD/RA activities. In addition, personnel will attend an initial hazard briefing prior to beginning work as well as the daily safety meetings.

Personnel will report the following to the SSO:

- Injuries and illnesses incurred on OU-1/OU-2, no matter how minor
- Unexpected or uncontrolled release of chemical substances
- Symptoms of chemical exposure
- Unsafe or hazardous situations
- Unsafe or malfunctioning equipment
- Changes in OU-1/OU-2 conditions that may affect the health and safety of project personnel
- Damage to equipment or property
- Situations or activities for which they are not properly trained
- Near misses

2.3 Visitors

Visitors to OU-1/OU-2 work areas must check in with the SSO. Visitors will be cautioned to avoid skin contact with materials that may be, or are suspected to be, impacted by constituents of concern (COCs).

Visitors requesting to observe OU-1/OU-2 RD/RA work must don appropriate PPE prior to entering the work area and must have the appropriate training and medical clearances to do so. If respiratory protective devices are necessary, visitors who wish to enter the work area must have been respirator-trained and fit-tested for a respirator within the past 12 months.

2.4 Stop Work Authority

Every worker conducting RD/RA work, including subcontractors (termed Site worker) is empowered, expected, and has the responsibility to stop the work if the working conditions or behaviors are considered unsafe.

In most cases, a stop-work order affects only those areas immediately involved in the hazardous situation. A stop-work order may be issued for a portion of the work area or an entire work area when the work area or work practices are not managed or maintained in a safe and healthy manner. The stop work order will remain in effect until the problem(s) are resolved and the work area(s) is in satisfactory conformance with established requirements. Work will not resume until appropriate corrective actions have been completed and documented, ensuring that the condition has been corrected.

Additional detail on the Stop Work procedure and the necessary approvals for resuming work are detailed in HS-203, included in Attachment B.

3. GENERAL SAFETY PRACTICES

This section describes some of the general safety practices that are applicable to the anticipated OU-1/OU-2 RD/RA support activities and summarizes some of the general practices, especially those practices that pertain to working on a hazardous waste site and references additional detail in later sections of this document.

At least one copy of this OU-1/OU-2 RD/RA HASP will be kept in a central location at OU-1/OU-2 and be readily available to personnel. Additional copies may be kept in work vehicles or temporary trailers for ease of reference. Subcontractors will be provided with a copy of this OU-1/OU-2 RD/RA HASP and may work under this HASP or under their own OU-1/OU-2 RD/RA HASP. Individual project personnel will acknowledge their understanding of the HASP by signing the Acknowledgment Form (Attachment A.1) prior to starting work. Personnel will also sign in for the daily safety briefings relevant to their tasks for the day. General safety rules for RD/RA support activities are intended to minimize exposure to personnel and the possibility of facilitating the movement of contamination from one area to another. These rules include, but are not limited to, the following:

- Hold daily safety briefings (Section 3.3) to discuss task-specific health and safety concerns and protective measures and to maintain a culture of safety as the first priority.
- Remove gloves and wash hands before consuming food, beverages, chewing gum, and using tobacco products. Sunscreen, poison ivy lotion or other cosmetics should be applied with clean hands and before donning PPE and entering the work area
- Follow safe driving practices at all times, including during commutes to and from work as well as during the workday. Safe driving practices include avoiding distracted driving, appropriate vehicle maintenance, wearing seatbelts, and only using seating designed for passengers (e.g., no riding in the bed of a pickup truck). Be aware of additional driving precautions and practices when on OU-1/OU-2.
- Wash hands before eating, drinking, smoking, and after using toilet facilities.
- Wear all PPE as required and appropriate for the task and replace damaged PPE when needed.
- Secure disposable coveralls, boots, and gloves at the wrists and legs.
- Remove and change contaminated clothing and wash the affected area if skin has contacted materials that may be impacted by COCs.
- Practice contamination avoidance. Avoid contact with surfaces either suspected or known to be impacted by COCs (e.g., standing water, mud, or discolored sediment).
- Store equipment on elevated or protected surfaces to reduce the potential for incidental contamination.
- Remove and replace PPE, as required, to limit the spread of COC-containing materials.

- Dispose of all single-use coveralls, soiled gloves, and respirator cartridges in designated receptacles at the end of each shift or as required.
- Do not remove materials containing OU-1/OU-2 COCs from protective clothing or equipment by using compressed air, shaking, or any other means that disperses contaminants into the air. Decontamination procedures are described in Section 8.6.
- Inspect nondisposable PPE and equipment for contamination before leaving the decontamination area. Items that are contaminated must be decontaminated or disposed of appropriately.
- Recognize emergency signals used for evacuation, injury, fire, etc.
- Report all injuries, illnesses, near misses, and unsafe conditions or work practices to the SSO.
- Use the buddy system (Section 3.4) during all operations requiring Level C PPE and, when appropriate, during Level D operations. Prepare and follow a journey management plan (Attachment A.2) if working in an isolated area.
- Use and obey warning signs, tags, and barriers. Do not remove any warnings unless authorized to do so.
- Follow good housekeeping practices at all times. Be sure to clearly identify work zones, be aware of trips, slips, and falls hazards, keep the work area neat, maintain adequate walkways and avoid creating slip, trip, and fall hazards.
- Incorporate plans for clearing brush, trash, or other obstacles before performing work.
- Store and maintain tools, equipment, and supplies in a mutually agreed upon area and in a way that facilitates common use and mutually agreed upon procedures.
- Use, adjust, alter, and repair equipment only if trained and authorized to do so and in accordance with the manufacturer's directions.
- Perform only tasks for which you have been properly trained and advise the supervisor if you have been not been trained for or feel unprepared for the task assigned.
- Do not work following the consumption of alcoholic beverages or other impairing substances. Possession or use of illicit drugs is strictly prohibited. If the job requires equipment operation, let the supervisor know if you must take prescription or over-the-counter drugs that state "do not operate heavy equipment," or "may cause drowsiness."
- Remain upwind during OU-1/OU-2 activities whenever possible.
- Be aware of the surroundings. Watch out for uneven or slippery terrain.

3.1 Competent Persons

Activities conducted on OU-1/OU-2 require differing levels of experience and training. Although all work will be conducted by or under the supervision of persons who are experienced with the tasks and equipment being used, some work requires a CP with documented training and experience. The following are activities for which a CP is required:

1. Confined space entry
2. Excavation
3. Heavy equipment
4. Fall protection
5. Lockout/tagout (LO/TO)
6. Respiratory protection
7. Radiation monitoring
8. Nuclear density gauge

HS 132 Competent Persons included in Attachment B describes specialized training that meets the minimum requirements for a person to qualify as a CP for a given activity or task. The Site enforces the OSHA requirement for a CP to oversee and/or direct specific activities that are, by their nature, inherently dangerous unless conducted properly and with care.

3.2 Job Safety Analysis

A JSA will be developed for each task or activity to be conducted on OU-1/OU-2. The JSA will be developed by the person(s) who will perform or supervise the work and will be reviewed by someone who understands and has experience with the type of work that will be conducted. Developing the JSA, in conjunction with this OU-1/OU-2 RD/RA HASP is an integral component of practicing a culture of safety first.

The JSA is a tool used to identify potential hazards, ensure that personnel are aware of and trained to manage those hazards, and develop corrective or protective systems to reduce the hazard. A JSA identifies the specific task, the potential hazards associated with the task, and the mitigating measures that will be taken to reduce the risks from those hazards. A JSA will be developed prior to implementing each task and may be updated if the task is to be performed under different circumstances or in a different location (e.g., soil sampling in open areas of OU-1/OU-2 may have different hazards than soil sampling near structures or railroad tracks. The JSA may incorporate procedures discussed in this OU-1/OU-2 RD/RA HASP or attachments or may identify the need for new or updated procedures. Hazards may be physical (e.g., lifting hazards, eye hazards) or environmental (e.g., those related to weather or biological hazards [stinging insects, snakes, etc.]). After identifying the hazards associated with an activity, control measures will be evaluated, and protective measures or procedures will be instituted. JSAs are reviewed periodically to confirm that the procedures and protective equipment specified for each activity are current and technically correct. Any changes in OU-1/OU-2 conditions or the scope of work may require a review of and modification to the JSA. During this review process, personnel should provide comments on the JSA and its procedures, and those comments should be addressed before conducting the activity. Specific aspects of the JSA will be incorporated into the daily health and safety briefings to reinforce awareness of the potential hazards and mitigation measures as well as to ensure a consistent approach among personnel.

A JSA template, including a signature page, is included in Attachment A.2. Subcontractors working under their own health and safety plan may use their own version of a JSA, as detailed in their OU-1/OU-2 RD/RA HASP. Copies of completed JSAs will be kept in a readily accessible, separately labeled binder on-site and filed electronically. Additional copies may be kept by the field crews conducting the work. Although JSAs should be routinely reviewed and updated to address the specific work that will be conducted, past copies will be retained as a part of the Site file.

3.3 Daily Health and Safety Meetings (tailgate meetings)

- OU-1/OU-2 personnel will receive a safety orientation and training prior to the start of any work.
- The level of training and method for providing orientation and training will consist of the mandatory items listed in this OU-1/OU-2 RD/RA HASP and the JSA, and a OU-1/OU-2-specific orientation based on the task specifics and location of the task.
- The depth/level of training will be proportionate to the job function(s). OU-1/OU-2 visitors will receive general orientation and task-specific training.
- At a minimum, initial personnel orientation and training will consist of the items listed below:
    - Identification of hazards associated with the individual's job function and responsibilities
    - Specific safety procedural instruction needed to perform his or her required job function or task
    - Content of the OU-1/OU-2 RD/RA HASP and JSA
    - Additional training for specific job functions (as needed)

Safety meetings will be conducted at the start of each workday, at the beginning of each new task, and when new personnel are introduced to OU-1/OU-2. The purpose of these meetings is to allow personnel an opportunity to maintain a high degree of safety awareness through timely safety education. This training will be used to discuss specific safety topics and obtain personnel feedback.

- Topics to be discussed will include safety hazards noted during the week and an explanation of job safety procedures.
- Other items open for discussion may include the following:
    - Use of PPE and personnel decontamination protocol
    - Project safety rules, safe work practices, and control measures
    - Personnel accidents and incident reviews
    - Review of applicable standard operating procedures to job-specific activities

- Personnel attendance at all safety orientation and training meetings will be documented on the Safety Meeting Log (Attachment A.3).

3.4 Buddy System

Personnel working at OU-1/OU-2 will use the buddy system as required by operations. The level and means of communication and the use of the buddy system will be documented in the JSA for the task. Levels of protection and the required and task-specific types of PPE at each level are discussed in Section 5.

Use of the buddy system is mandatory during all operations requiring Level C PPE and, when appropriate, during Level D operations. The buddy system will be strictly adhered to during any water-related activities. At no time will anyone enter the water without another individual readily available to contact emergency services. Crew members in Level C PPE must observe each other for signs of chemical exposure and heat or cold stress. Indications of adverse effects include, but are not limited to the following:

- Changes in complexion and skin coloration
- Changes in coordination
- Changes in demeanor
- Excessive salivation and pupillary response
- Changes in speech pattern

Crew members must also be aware of the potential exposure to possible safety hazards, unsafe acts, or noncompliance with safety procedures.

Field personnel must inform their partners or fellow crew members of nonvisible effects of exposure to toxic materials that they may be experiencing. The symptoms of such exposure may include, but are not limited to the following:

- Headaches
- Dizziness
- Nausea
- Blurred vision
- Cramps
- Irritation of eyes, skin, or respiratory tract

If PPE or noise levels impair communications, prearranged hand signals will be used for communication. Personnel must stay within sight of another team member.

Line-of-sight use of the buddy system may not be required for all routine activities; however, someone other than the person performing the activity should know where work is being

performed and what activities are being performed. If line-of-sight contact is not used, radio or phone communications should be used regularly. If work is being performed in isolated areas (e.g., the culverts underneath Highway 202), around water, or in extreme temperatures, line-of-sight communications should always be maintained. When working alone under the conditions described above, a lone worker monitoring/communications device may be an acceptable substitute for the buddy system.

When working in portions of OU-1/OU-2 where line of sight visibility is difficult or concerns for personal safety are present, additional communications with the client or Project Manager may be appropriate. In these cases, a journey management plan will be submitted prior to the beginning of each workday. The plan will state where the work will be conducted, what type of work will be conducted, members of the field team, and the specific requirements of who to contact in case of emergency and who to inform of completion of the day's activities. A template for a journey management plan is included with the JSA template in Attachment A.2.

3.5 Safe Work Observation

Safe work observations (SWOs) will be conducted periodically by the field teams. The purpose of the SWO is to identify and correct potential hazards and to positively reinforce behaviors and practices that promote a culture of safety first. The observer will identify potential deviations from safe work practices that could possibly result in an incident and take prompt corrective action. The SWO process includes the following steps:

- Identify tasks that have the greatest potential for an injury or loss.
- Review the procedure (JSA) for completing the task.
- Discuss the task with personnel being observed and the observer.
- Observe the Site worker completing the task.
- Reference the SWO Form (Attachment A.4) for specific observation items. Complete the form, documenting positive actions as well as areas in need of improvement.
- Discuss the results of the SWO with the Site worker. Discuss any corrective action that is necessary.
- Implement corrective action.
- Communicate the results of the SWO and corrective action to the Project Manager and the SSO.

The intent of the SWO process is to reinforce positive behaviors. If needed, the process can also be used to correct unsafe behaviors. To these ends, the findings from the SWO process should be conveyed to the project team, usually in a subsequent daily meeting. Findings should be behavior oriented and should not identify or otherwise single out the observed individual. Findings should be presented to the team in a way that reinforces positive behaviors for every member of the team.

3.6 Incident Investigation and Near Miss Reporting

An "incident" is any of the following events: first aid cases, injuries, illnesses, spills/leaks, equipment or property damage, motor vehicle accidents, regulatory violations, fires, and business interruptions. All incidents will be investigated within 24 hours and reported to the Project Manager and P/S representative.

The purpose of conducting an incident investigation is to prevent the recurrence of a similar hazardous event. An incident investigation is set up to assure that all incidents are reviewed in the same manner. The results of the incident investigation should reveal the root cause, and that information will be distributed to all OU-1/OU-2 personnel. Appropriate measures will be taken to avoid a similar hazard in the future.

A "near miss" is an incident in which no injury, illness, motor vehicle accident, equipment damage or property damage occurred, but in which, under slightly different circumstances, could have occurred. Near miss investigations, reports, and communications are useful for identifying and communicating hazardous situations and mitigating the hazard before an injury or loss does occur. Near misses must also be reported to the Project Manager and P/S representative as a means of emphasizing positive behaviors and avoiding injuries or damages. The Incident/Near-Miss Investigation Report is included in Attachment A.5.

3.7 Other Circumstances

Although this OU-1/OU-2 RD/RA HASP, the attached health and safety procedures (Attachment B), and the associated JSAs are intended to address most of hazards that are anticipated in conducting RD/RA work, it is possible that other hazards may be encountered. If the hazard can be addressed by knowledgeable personnel at OU-1/OU-2, a new or updated JSA can be used to address the new hazard. If the unanticipated hazard is outside of the expertise of the field personnel, work will be stopped and knowledgeable expertise and equipment (if needed) will be brought in to address the situation. The following are some circumstances that may require expert involvement:

- Encountering ordnance or explosives or unexploded ordnance
- Encountering potential asbestos-containing material
- Encountering unknown, unlabeled drums or containers, or other unknown subsurface conditions (e.g., nonaqueous phase liquid, unusual staining or coloration)
- Using high-voltage electricity as a part of or near OU-1/OU-2 operations
- Using specialized chemicals or equipment for a specific task (e.g., using explosives for geophysical investigations)
- The use of divers to conduct underwater work; this includes commercial diving regulated under 29CFR Part 1910 subpart T Appendix B and diving conducted under a scientific program pursuant to the requirements presented in 29CFR 1910.401 (USEPA 2016)

It is expected that subcontractors will be retained for their specific area of expertise. A part of this expertise is their knowledge and experience in managing the hazards associated with the specific task (e.g., operating heavy equipment, electrical work). If a subcontractor is brought in, the subcontractor may prepare and operate under their own OU-1/OU-2 RD/RA HASP or task-specific JSA, including their own reporting and documentation forms, if appropriate. It also may be appropriate for the subcontractor to communicate their specific procedures to others working near or with them. Evaluating subcontractor expertise and health and safety procedures will be a part of the procurement process. Communicating consistent governing health and safety procedures to a mixed project team should be done as a part of the JSA development process and daily safety briefings.

3.8 General Hazards

The following subsections deal with general hazards that may be encountered during many of OU-1/OU-2 activities.

3.8.1 Heat Stress

Heat stress is caused by several interacting factors, including environmental conditions, clothing, and workload, as well as the physical and conditioning characteristics of the individual. Since heat stress is one of the most common illnesses associated with heavy outdoor work conducted in direct sun, and because wearing PPE can increase the risk of developing heat stress, personnel must be aware of the types and causes of heat-related illnesses and be able to recognize the signs and symptoms of these illnesses in themselves and their coworkers.

Heat rash is one of the most common problems in hot work environments. Commonly known as prickly heat, a heat rash is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, these papules give rise to a prickling sensation. Prickly heat occurs in skin that is persistently wetted by unevaporated sweat, and heat rash papules may become infected if they are not treated. In most cases, heat rashes will disappear when the affected individual returns to a cool environment.

Heat cramps are usually caused by performing hard physical labor in a hot environment. These cramps have been attributed to an electrolyte imbalance caused by sweating. It is important to understand that cramps can be caused by either too much or too little salt.

Heat cramps appear to be related to a lack of water replenishment. Because sweat is a hypotonic solution (plus or minus 0.3% sodium chloride [NaCl]), excess salt could build up in the body if the water lost through sweating is not replaced. Thirst cannot be relied on as a guide to the need for water; instead, water must be taken every 15 to 20 minutes in hot environments.

Under extreme conditions, such as a very hot or humid day or working for 6 to 8 hours in heavy protective gear, electrolytes may be lost. Drinking commercially available carbohydrate electrolyte replacement liquids can help minimize physiological disturbances during recovery.

Heat exhaustion occurs from increased stress on various body organs due to inadequate blood circulation, cardiovascular insufficiency, or dehydration. Signs and symptoms of heat exhaustion

include pale, cool, moist skin; heavy sweating; dizziness; nausea; headache; vertigo; weakness; thirst; and giddiness. Heat exhaustion should not be dismissed lightly and should be treated immediately. Fainting associated with heat exhaustion can be dangerous because the person may be operating machinery or controlling an operation that should not be left unattended; moreover, the person may be injured when he or she faints. Also, the signs and symptoms seen in heat exhaustion are similar to those of heat stroke, which is a medical emergency. Personnel suffering from heat exhaustion should be removed from the hot environment, given fluid replacement, and be encouraged to get adequate rest.

Heat stroke is the most serious form of heat stress. Heat stroke occurs when the body's system of temperature regulation fails, and the body's temperature rises to critical levels. This condition is caused by a combination of highly variable factors and its occurrence is difficult to predict.

Heat stroke is a medical emergency. The primary signs and symptoms of heat stroke are elevated or erratic pulse; confusion; irrational behavior; loss of consciousness; convulsions; a lack of sweating (usually); hot, dry skin; and an abnormally high body temperature. If body temperature is too high, it causes death. The elevated metabolic temperatures caused by a combination of workload and environmental heat load, both of which contribute to heat stroke, are also highly variable and difficult to predict.

If a worker shows signs of possible heat stroke, professional medical treatment should be obtained immediately. The person should be placed in a shady area and the outer clothing should be removed. The person's skin should be wetted and air movement around them should be increased to improve evaporative cooling until professional methods of cooling are initiated and the seriousness of the condition can be assessed. Fluids should be replaced as soon as possible. The medical outcome of an episode of heat stroke depends on the person's physical fitness and the timing and effectiveness of first aid treatment.

No Site worker suspected of being ill from heat stroke should be sent home or left unattended unless a physician has specifically approved such an order.

Proper training and preventive measures will help avert serious illness and loss of work productivity. Preventing heat stress is particularly important because once someone suffers from heat stroke or exhaustion, that person may be predisposed to additional heat injuries.

3.8.1.1 Safety Precautions for Heat Stress Prevention

Heat stress monitoring and work-rest cycle implementation should commence when the ambient adjusted temperature exceeds 72 degrees Fahrenheit (°F). A minimum work-rest regimen and procedures for calculating ambient adjusted temperature are described in Table 3-1. Heat stress monitoring will be conducted for each individual worker and documented on the Heat Stress Exposure Monitoring form (Attachment A.6).

Table 3-1. Heat Stress Work/Rest Schedule[1]

Adjusted Temperature[2]	Work/Rest Regimen Normal Work Ensemble[3]	Work/Rest Regimen Impermeable Ensemble
90ºF (32.2ºC) or above	After each 45 minutes of work	After each 15 minutes of work
87.5º–90ºF(30.8º–32.2ºC)	After each 60 minutes of work	After each 30 minutes of work
82.5º–87.5ºF (28.1º–30.8ºC)	After each 90 minutes of work	After each 60 minutes of work
77.5º–82.5ºF (25.3º–28.1ºC)	After each 120 minutes of work	After each 90 minutes of work
72.5º–77.5ºF (30.8º–32.2ºC)	After each 150 minutes of work	After each 120 minutes of work

1. For work levels of 250 kilocalories/hour (light to moderate type of work)
2. Calculate the adjusted air temperature (ta adj) by using this equation: ta adj °F = ta °F + (13 x % sunshine). Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100% sunshine = no cloud cover and a sharp, distinct shadow; 0% sunshine = no shadows.)
3. A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.
4. Rest cycle is assumed to last 5–15 minutes.

Source: The information presented above was generated using the information provided in the American Conference of Governmental Industrial Hygienists (ACGIH) *Threshold Limit Values [TLV] Handbook* (2003a).

In order to determine whether the work-rest cycles are adequate for the personnel and specific OU-1/OU-2 conditions, personnel will monitor their own heart rates during the rest cycle. Personnel will also ensure that others working nearby are also monitoring their own heart rate. To check the heart rate, count the radial pulse for 30 seconds at the beginning of the rest period. If the heart rate exceeds 110 beats per minute, shorten the next work period by one-third and maintain the same rest period.

Additionally, one or more of the following control measures can be used to help control heat stress. If any Site worker has a heart rate (measured immediately prior to rest period) exceeding 115 beats per minute, then one or more of these control measures is mandatory:

- Personnel will be encouraged to drink plenty of water and electrolyte replacement fluids throughout the day.
- On-site drinking water will be kept cool.
- A work regimen that provides adequate rest periods for cooling down will be established, as required.
- All personnel will be advised of the dangers and symptoms of heat stroke, heat exhaustion, and heat cramps.
- Cooling devices, such as vortex tubes or cooling vests, should be used when personnel must wear impermeable clothing in conditions of extreme heat.

- Personnel should be instructed to monitor themselves and their buddy (if applicable) for signs of heat stress and to take additional breaks as necessary.
- A shaded rest area must be provided. All breaks should take place in the shaded rest area.
- Personnel must not be assigned to other tasks during breaks.
- Personnel must remove impermeable garments during rest periods. This includes white Tyvek®-type garments.
- All personnel must be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress disorders.

3.8.1.2 Heat Stress Training

Personnel potentially exposed to heat stress will receive training that is documented in project files. Personnel will be trained on the following:

- Sources of heat stress, influence of protective clothing, and importance of acclimatization
- How the body handles heat
- Types of heat-related illnesses
- Preventative/corrective measures to include fluid intake and control measures
- First aid procedures for heat stress

OU-1/OU-2 and project health and safety representatives will be trained on measurement methods and calculations of heat stress indices and establishing work schedules.

3.8.2 Cold Stress

Fatal exposures to cold almost always result from accidental exposures involving failure to escape from low air temperatures or from immersion in low-temperature water. The single most important aspect of life-threatening hypothermia is when deep core body temperature drops. Personnel should be protected from exposure to cold so that the deep core temperature does not fall below 96.8°F; lower body temperatures will very likely result in reduced mental alertness, reduced rational decision making, or loss of consciousness with the threat of fatal consequences.

Pain in the extremities may be the first early warning of danger from cold stress. During exposure to cold, severe shivering develops when the body temperature has fallen to 95°F. This severe shivering is a sign of danger, and exposure to cold should be immediately terminated for any person when severe shivering becomes evident.

Cold stress normally occurs in temperatures at or below freezing or under certain circumstances in temperatures of 40°F. However, cold stress can occur at warmer temperatures, especially if it is rainy or windy, if personnel are underdressed and working on or near water or outdoors and inactive for extended periods of time. Extreme cold for a short time may cause severe injury to

exposed body surfaces and can cause core body temperature to fall resulting in death. Areas of the body that have high surface-area-to-volume ratio, such as fingers, toes, and ears, are the most susceptible to frostbite. Two factors influence the development of a cold-weather injury: ambient temperature and the velocity of the wind. For instance, 10°F with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at -18°F. An equivalent chill temperature (ECT) chart relating the actual dry-bulb temperature and wind velocity is presented in Table 3-2.

There are several degrees of tissue damage associated with frostbite. Frostbite of the extremities can be categorized into the following:

- *Frost Nip or Incipient Frostbite*: Characterized by sudden blanching or whitening of skin.
- *Superficial Frostbite*: Skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- *Deep Frostbite*: Tissues are cold, pale, and solid; extremely serious injury.

Systemic hypothermia is caused by exposure to cold temperatures. It can be fatal. Its symptoms are usually exhibited in five stages:

1. Shivering
2. Apathy, listlessness, sleepiness, and (sometimes) rapid cooling of the body to less than 95°F
3. Unconsciousness, glassy stare, slow pulse, and slow respiratory rate
4. Freezing of the extremities
5. Death

Table 3-2. Cold Stress Chill Temperature Chart

Estimated Wind Speed (in mph)	50	40	30	20	10	0	-10	-20	-30	-40
	Equivalent Chill Temperature (ECT) (°F)									
Calm	50	40	30	20	10	0	-10	-20	-30	-40
5	48	37	27	16	6	-5	-15	-26	-36	-47
10	40	28	16	4	-9	-24	-33	-46	-58	-70
15	36	22	9	-5	-18	-32	-45	-58	-72	-85
20	32	18	4	-10	-25	-39	-53	-67	-82	-96
25	30	16	0	-15	-29	-44	-59	-74	-88	-104
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116
Wind speeds greater than 40 mph have little additional effect	Little Danger: Maximum danger of false sense of security				Increasing Danger: Danger from freezing of exposed flesh within one minute			Great Danger: Flesh may freeze within 30 seconds		

This chart was developed by the US Army Research Institute of Environmental Medicine, Natick, MA.
[Source: ACGIH *TLV Handbook,* 2003a]

Trauma sustained in freezing or subzero conditions requires special attention because injured personnel are predisposed to secondary cold injury. Special provisions must be made to prevent hypothermia and secondary freezing of damaged tissues in addition to providing for first aid treatment. To avoid cold stress, Site workers must wear protective clothing appropriate for the level of cold and physical activity. In addition to protective clothing, preventive safe work practices, additional training, and warming regimens may be used to prevent cold stress.

3.8.2.1 Safety Precautions for Cold Stress Prevention

The following safety precautions should be followed to prevent cold stress:

- At air temperature of 0°F or less, mittens should be used to protect the hands. For exposed skin, continuous exposure should not be permitted when air speed and temperature results in an equivalent chill temperature (ECT) of -25°F.
- At air temperatures of 40°F or less, personnel should take care to stay dry or wear clothing that maintains warmth even when wet. If clothing becomes wet, the person should be immediately provided with a change of clothing and warm up before resuming outdoor activities.

- If a work area is windy, drafty, or affected by artificial ventilating equipment, the cooling effect of the wind should be reduced by shielding the work area or by wearing a windbreak garment.
- If work is done at normal temperature or in a hot environment before entering the cold, the field personnel must confirm that their clothing is not wet from sweating. If clothing is wet, field personnel must change into dry clothes prior to entering the cold area.
- If the available clothing does not give adequate protection to prevent hypothermia or frostbite, work must be modified or suspended until adequate clothing is made available or until weather conditions improve.
- Field personnel handling evaporative liquid (e.g., gasoline, alcohol, or cleaning fluids) at air temperatures below 40°F must take special precaution to avoid soaking of clothing or gloves with the liquids because of the added danger of cold injury due to evaporative cooling.
- Personnel should be instructed to monitor themselves and their buddy for signs of cold stress and to take additional breaks if necessary.

3.8.2.2 Safe Work Practices

The following safe work practices must be employed to prevent cold stress:

- Direct contact between bare skin and cold surfaces (< 30°F) should be avoided. Metal tool handles and equipment controls should be covered by thermal insulating material.
- For work performed in a wind chill temperature at or below 10°F, personnel should be under constant protective observation (buddy system). The work rate should be established to prevent heavy sweating that will result in wet clothing. For heavy work, rest periods must be taken in heated shelters and personnel should be provided with an opportunity to change into dry clothing if needed.
- Field personnel should be provided the opportunity to become accustomed to cold-weather working conditions and required protective clothing.
- Work should be arranged in such a way that sitting or standing still for long periods is minimized.
- During the warming regimen (rest period), field personnel should be encouraged to remove outer clothing to permit sweat evaporation or to change into dry work clothing. Dehydration, or loss of body fluids, occurs insidiously in the cold environment and may increase susceptibility to cold injury due to a significant change in blood flow to the extremities. Replacing fluids with warm, sweet drinks and soups is recommended. Coffee intake should be limited because of diuretic and circulatory effects.

3.8.2.3 Hands

Special protection of the hands is required to maintain manual dexterity for the prevention of accidents:

- If fine work is to be performed with bare hands for more than 10 to 20 minutes in an environment below 40ºF, special provisions should be established for keeping hands warm. For this purpose, warm air jets, radiant heaters (fuel burner or electric radiator), or contact warm plates may be used. Metal handles of tools and control bars should be covered by thermal insulating material at temperatures below 30ºF.
- If the air temperature falls below 50ºF for sedentary work, 40ºF for light work, or 20ºF for moderate work, and fine manual dexterity is not required, then gloves should be used.
- To prevent contact frostbite, personnel should wear anti-contact gloves:
  - When cold surfaces below 20ºF are within reach, a warning should be given to each worker to prevent inadvertent contact by bare skin.
  - If the air temperature is 0ºF or less, the hands should be protected by mittens. Machine controls and tools for use in cold conditions should be designed so that they can be handled without removing the mittens.
- Provisions for additional total body protection are required if work is performed in an environment at or below 30ºF. Personnel should wear cold-protective clothing appropriate for the level of cold and physical activity.

3.8.2.4 Work Warming Regimen

If work is performed continuously in the cold at an ECT at or below -15°F, heated warming shelters (e.g., tents, cabins, rest rooms) should be made available nearby. Personnel should be encouraged to use these shelters at regular intervals; the frequency will depend on the severity of the environmental exposure. The onset of heavy shivering, minor frostbite (frost nip), the feeling of excessive fatigue, drowsiness, irritability, or euphoria are indications that personnel should immediately return to the shelter. When in the heated shelter, personnel should remove the outer layer of clothing and loosen the remainder of the clothing to permit sweat evaporation or change into dry work clothing. A change of dry work clothing should be provided as necessary to prevent personnel from returning to work with wet clothing.

Table 3-3 (below) provides guidelines for a work/warm-up schedule.

Table 3-3. Cold Stress Work/Warm-Up Schedule Guidelines

Air Temp. (Sunny Sky) °F	No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind		25 mph Wind	
	Max. Work Time	Breaks	Max. Work Time	Breaks	Max. Work Time	Breaks	Max. Work Time	Breaks	Max. Work Time	Breaks	Max. Work Time	Breaks
above 5°	Normal Work Sched.		Normal Work Sched.		Normal Work Sched.		Normal Work Sched.		Normal Work Sched.		Normal Work Sched.	
5° to -1°											100 min	2
0° to -4°									100 min	2	75 min	2
-5° to -9°							100 Min	2	75 min	2	55 min	3
-10° to -14°					100 Min	2	75 Min	2	55 min	3	40 min	4
-15° to -19°			100 min	2	75 Min	2	55 Min	3	40 min	4	30 min	5
-20° to -24°	100 min	2	75 min	2	55 Min	3	40 Min	4	30 min	5	Cease Work	
-25° to -29°	75 min	2	55 min	3	40 Min	4	30 Min	5	Cease Work			
-30° to -34°	55 min	3	40 min	4	30 Min	5	Cease Work					
-35° to -39°	40 min	4	30 min	5	Cease Work							
-40° to -44°	30 min	5	Cease Work									
-44° & below	Cease Work											

Modified from ACGIH's 2010 Threshold Limit Values (TLV) for Chemical Substances and Physical Agents.

Notes

1: Schedule describes the maximum continuous duration of work and number of 10- to 15-minute breaks to be observed during any 4-hour work period and assumes that period will be followed by an extended warm-up period (e.g., lunch). Allowed breaks should be taken in a warm environment.

2: Schedule applies to moderate to heavy work performed by acclimated personnel wearing appropriate layered clothing. For light to moderate work apply the schedule for conditions 1 step lower. For unacclimated personnel apply the schedule for conditions 2 steps lower. These modifications are additive.

3: For work under 25%–50% overcast/clouds apply the schedule for conditions 1 step lower. For work at night or under greater than 50% overcast/clouds apply the schedule for conditions 2 steps lower. These modifications are additive with any applicable modifications from Note 2.

4: For wind speeds over 25 mph cease all nonemergency work when temperatures fall below 5°F.

3.8.2.5 Other Work Practices

For work practices at or below 10°F ECT, the following should apply:

- Personnel should be under constant protective observation (buddy system or supervision).
- The work rate should not be so high as to cause heavy sweating that will result in wet clothing; if heavy work must be done, rest periods should be taken in heated shelters and opportunity for changing into dry clothing should be provided.
- New personnel should not be required to work full time in the cold during the first days of employment until they become accustomed to the working conditions and required protective clothing.
- The weight and bulkiness of clothing should be included in estimating the required work performance and weights to be lifted by personnel.
- The work should be arranged in such a way that sitting still or standing still for long periods is minimized. Unprotected metal chair seats should not be used. Personnel should be protected from drafts to the greatest extent possible.
- Personnel should be instructed in safety and health procedures, which should address the following:
  - Proper rewarming procedures and appropriate first aid treatment
  - Proper clothing practices
  - Proper eating and drinking habits
  - Recognition of impending frostbite
  - Recognition of signs and symptoms of impending hypothermia or excessive cooling of the body even when shivering does not occur
  - Safe work practices
- Eye protection should be supplied for personnel employed outdoors in a snow- or ice-covered terrain. To protect against ultraviolet light and glare (which can produce temporary conjunctivitis and temporary loss of vision) and blowing ice crystals, special safety goggles should be required when there is an expanse of snow coverage causing a potential eye exposure hazard.
- Personnel handling evaporative liquid (gasoline, alcohol, or cleaning fluids) at air temperatures below 40°F should take special precautions to avoid soaking clothing or gloves with the liquids because of the added danger of cold injury due to evaporative cooling. Special note should be taken of the particularly acute effects of splashes of cryogenic fluids or those liquids with a boiling point that is just above ambient temperature.
- Trauma sustained in freezing or subzero conditions requires special attention because an injured person is predisposed to cold injury. Special provisions should be made to

prevent hypothermia and freezing of damaged tissue in addition to providing first aid treatment.

3.8.2.6 Cold-Related Illness and Treatment

Frostbite

If exposure occurs in temperatures that are below freezing (30°F or below), frostbite or trench foot (immersion foot) may accompany or complicate the symptoms of hypothermia. Frostbite is the freezing of living tissues with a resultant breakdown of cell structure. Injury due to frostbite may range from superficial redness of the skin, slight numbness, and blisters, to the obstruction of blood flow (ischemia), blood clots (thrombosis), or skin discoloration due to insufficient oxygen in the blood (cyanosis). Frostbite may occur if the skin contacts objects with a surface temperature below freezing, such as metal tool handles. Trench foot is caused by continuous exposure to cold combined with persistent dampness or immersion in water. Injuries in this case include permanent tissue damage due to oxygen deficiency, damage to capillary walls, severe pain, blistering, tissue death, and ulceration. Additionally, cold exposures may either induce or intensify vascular abnormalities. These include chilblain (a swelling or sore), Raynaud's disease, acrocyanosis (blueness of hands and feet), and thromboangiitis (inflammation of the innermost walls of blood vessels with accompanying clot formation). Personnel suffering from these ailments should take extra precaution to avoid chilling.

Frostbite treatment

- Wrap the person in woolen cloth and keep dry until he or she can be brought inside.
- Do not rub, chafe, or manipulate frozen parts.
- Bring the person indoors.
- Place the person in warm water (102° to 105°F) and make sure the water remains warm. Test the water by pouring it on the inner surface of your forearm. Never thaw affected body parts if the person has to go back out into the cold. The affected area may be refrozen.
- Do not use hot water bottles or a heat lamp, and do not place the person near a hot stove.
- Do not allow the person to walk if his or her feet are affected.
- Have the person gently exercise the affected parts once they are thawed.
- Seek medical aid for thawing of serious frostbite.

Hypothermia

Hypothermia damages both the body's internal temperature mechanisms (hypothalamus) and the peripheral mechanisms to prevent heat loss (vasoconstriction and perspiration). These effects may last up to three years.

Hypothermia treatment

- Give artificial respiration and stop any bleeding, if necessary.
- Bring the person into a warm room or shelter as quickly as possible.
- If the person cannot be moved (e.g., spinal injury), carefully place newspapers, blankets, or some other insulation between the person and the ground.
- Remove all wet clothing.
- Provide an external heat source since the body cannot generate its own heat. Wrap the person in prewarmed blankets, place him or her in the liner of a portable hypothermia treatment unit, put the torso (not the extremities) into a tub of warm water or use body-to-body contact to rewarm the body core. These measures will slowly reopen the peripheral circulation, minimizing the possibility of after-shock or after-drop (the flowing of cooled, stagnated blood from the limbs to the heart), which may cause ventricular fibrillation, cardiac arrest, or death.
- Do not allow the person to sleep.
- Give warm, sweet drinks, no alcohol or pain relievers.
- Keep the person still. Do not let them walk.
- Do not rub numb skin.
- Get medical help as soon as possible.

3.8.3 Biological Hazards

Hazardous biologicals may include poisonous plants, ticks, mosquitoes, bees, spiders, scorpions, snakes, dogs, and other animals. Although the information presented in this section is intended to protect personnel and prevent injury from biological hazards, biological hazards can be so prevalent that exposure and injury can occur. Section 3.8.3.4 of this procedure discusses appropriate first aid and medical treatment steps that should be taken in some cases.

3.8.3.1 Hazards

Poisonous Plants

Poisonous plants (e.g., poison ivy, poison sumac, and poison oak) may be present in the work area. Personnel should be alerted to their presence, trained to recognize the plant(s), and instructed on methods to prevent exposure.

Poisonous plants contain an oily chemical (urushiol) that will cause an allergic reaction in approximately 80% to 90% of the population. Exposure will cause a rash that forms within 24 to 72 hours of contact, depending on where the plant has touched the skin. It usually peaks within a week but can last as long as 3 weeks. A rash from poison ivy, oak, or sumac looks like patches or streaks of red, raised blisters. The rash doesn't usually spread unless urushiol is still in contact with skin. The urushiol can still be present on the plant and cause a rash even after all the leaves have dropped.

Snakes

Encountering snakes is a possibility, especially for personnel working in wooded/vegetated areas. Snake venoms are complex and include proteins, some of which have enzymatic activity. Venoms can induce neurotoxic effects with sensory, motor, cardiac, and respiratory difficulties; cytotoxic effects on red blood cells, blood vessels, heart muscle, kidneys, and lungs; defects in coagulation; and effects from local release of substances by enzymatic actions. Other noticeable effects of venomous snakebites include swelling, edema, and pain around the bite, and the development of ecchymosis (the escape of blood into tissues from ruptured blood vessels). Snakes encountered may range from common garter and watersnakes to rat snakes, king snakes, and pit vipers.

Ticks, Mosquitos, Bees, Ants, Scorpions, and Spiders

Stinging and biting insects, scorpions, and spiders can cause symptoms ranging from minor irritation to serious diseases and allergic reactions. Site workers should be aware of the potential to encounter these animals and do their best avoid them, where possible. If stung or bitten, first aid should be administered, and the person should be observed in case symptoms worsen requiring additional medical assistance (see Section 3.8.3.4). Some of the more serious diseases and injuries that can develop following tick and spider bites are discussed below.

Rocky Mountain Spotted Fever: This disease is transmitted via the bite of an infected tick. The tick must be attached for four to six hours before the disease-causing organism (*Rickettsia rickettsii*) becomes reactivated and can infect humans. The primary symptom of Rocky Mountain Spotted Fever is the sudden appearance of a moderate-to-high fever. The fever may persist for two to three weeks. The person may also have a headache, deep muscle pain, and chills. A rash appears on the hands and feet on about the third day and eventually spreads to all parts of the body. For this reason, Rocky Mountain Spotted Fever may be confused with measles or meningitis. The disease may cause death if untreated, but if identified and treated promptly, death is uncommon.

Lyme Disease: This disease is transmitted primarily via the bite of an infected deer tick, which is smaller and redder than the common wood tick (Attachment B). It may also be transmitted by immature ticks, which are small and hard to see. The tick may be as small as a period on this page. Symptoms of Lyme disease include a rash or a peculiar red spot, like a bull's-eye circle, which expands outward. The person may have headache, weakness, fever, a stiff neck, and swelling and pain in the joints.

Spiders: Two spiders are of primary concern: the black widow and the brown recluse. Both prefer dark, sheltered areas such as basements, equipment sheds and enclosures, and they can also be found around woodpiles or other scattered debris. The black widow is shiny black, approximately one inch long, and found throughout the United States (US). There is a distinctive red hourglass marking on the underside of the black widow's body. The bite of a black widow is seldom fatal to healthy adults, but effects include respiratory distress, nausea, vomiting, and muscle spasms. The brown recluse is smaller than the black widow and gets its name from its brown coloring and behavior. The brown recluse is most prevalent in the southern US. It has a distinctive violin shape marking on the top of its body. The bite of the brown recluse is painful, and the bite site ulcerates and takes many weeks to heal completely.

Mosquitos, Bees, and Scorpions: Stings from mosquitos, bees, and scorpions are usually not life threatening. However, increasingly more mosquito-borne illnesses are identified in the US every year. Stings from bees and scorpions can cause a severe allergic reaction.

Mammals: Mammals (e.g., raccoons, skunks, dogs) may be carrying rabies or other infectious diseases; all bites or scratches should be seen by a medical professional.

3.8.3.2 Protection from Biological Hazards

The steps to protect from biological hazards are similar for each of the hazards and include avoidance, engineering controls, and personal protection, often used in combination. For each hazard, the main control is to recognize the hazard and avoid contact. Usually the risks from biological hazards are not life threatening; however, some bites, stings, and allergic reactions, can cause life-threatening or debilitating conditions. Despite precautions, exposures to biologicals are common, and it is sometimes difficult to control injuries during field work. First aid should be administered, and further medical treatment may be needed to address these conditions (Section 3.8.3.4).

It is a priority to protect personnel from biological hazards. Personnel will use effective control and preventative measures. Project Managers are obligated to consider these methods and to select and implement the methods that are most appropriate for their work activities. The selected measures will be documented in the JSA, along with training requirements (3.8.3.3).

Avoidance

Avoidance is limiting work activities to areas where the possibility of encountering biological hazards is low:

- Grass-covered areas that are mowed on a regular basis and where the grass is less than 4 inches tall
- Areas where all vegetation has been removed for a distance of at least 6 feet in all directions from areas where personnel will be present
- Areas where there are trees, but the ground-level vegetation has been cleared
- Areas where vegetation is newly planted (less than 7 days)

Use caution when opening well caps and covers; inspect potential nesting areas before opening casing, vaults, etc. Use heavy work gloves to open well caps and a long tool such as a drag hook to open large diameter covers on the interceptor wells. Mark and avoid fire ant mounds and beehives.

Personnel are encouraged to wear long pants, long-sleeved shirts, and gloves and to apply commercially available insect repellant (and sunscreen) to areas of unprotected skin.

Work will not be conducted where dogs are loose without the immediate and constant presence of the dog owner. In most cases, work should not proceed unless the dog is restrained. The team

should be aware that wild, stray, or unleashed dogs might be present. Other wild animals, including raccoons and skunks, may be present in urban and rural areas.

If dogs or unusually behaved animals are encountered, the team should not approach or provoke the animals. However, mace may be used as a deterrent, if necessary. If the animals are encountered within city limits, the team should report the animals to the Anniston Police Department Animal Control. Otherwise, Calhoun County Animal Control may be called. Animal control office phone numbers are presented at the front of this OU-1/OU-2 RD/RA HASP.

If the avoidance method is the plan to be used, the JSA must include a section on biologicals safety and must state both the planned implementation of this method and any appropriate OU-1/OU-2-specific limitations (e.g., all work will be limited to the mowed portions of the work area).

Removal of Biological Hazards

The removal method is simply removing or destroying poisonous plants and habitat attractive to ticks, other insects, and animals. Removal can be accomplished by the following, if conditions permit:

- *Areas of mixed ground cover*: Remove all grasses, and other ground-level vegetation by mechanical methods.
- *Areas of grasses only*: Mow grasses at least five days prior to conducting any field work.
- *Pest control*: Apply insecticide to the work area.
- *Herbicides*: Applying herbicides may be effective to remove poisonous plants if applied according to the instructions (mechanical removal of areas of poisonous plants is not advised).

The removal method must provide an area where personnel can work and remain at least 6 feet from any uncleared/unmowed vegetation areas. If the requirements of this method have been successfully met, no further personnel protective measures are necessary. However, personnel are still urged to apply a commercially available insect repellant (and sunscreen) to areas of unprotected skin.

Where the removal or destruction method is employed, the JSA must include a section on biologicals safety and must state both the planned implementation of this method and any appropriate OU-1/OU-2-specific limitations (e.g., mowing requirements, application of pesticide).

Personal Protection

Personal protective measures will be implemented based on the hazard presented to the personnel performing the field work. Different areas of the site may present different hazard levels and require separate protective requirements.

To minimize the risk of snake bites and exposure to other biologicals, all personnel walking through vegetated areas must be aware of the potential for encountering biologicals and the need

to avoid actions that may disturb wildlife, such as turning over logs. Wear sturdy boots tuck pant legs into boots, and, if possible, try to walk in the center of the path and keep a distance from heavily vegetated borders or rock walls. Snake guards (chaps) and other task and location specific PPE (e.g., specialty gloves) may be necessary depending on the work location and the type of work and should be specified in the JSA. Light-colored clothing makes it easier to identify and remove ticks from the clothing. Wear gloves if touching plants, soil, or rocks.

Several sprays and lotions are available for clothing and skin to protect from poisonous plants and insects. Applying preventative lotion that has bentoquatam (e.g., IvyX™) and frequently washing potentially exposed skin with soap and water, alcohol or alcohol wipes, or postcontact poison ivy cleansers (e.g., Technu®, IvyX™) are effective for preventing a rash from poisonous plants. Preventative lotion acts as a barrier between urushiol and the skin. However, the product only delays the penetration of the urushiol; after contact with the plants, wash the product off thoroughly as soon as possible (but at least within four hours). For continued protection, reapply the product every four hours. Any person who already has a rash from poison ivy, oak, or sumac should not use these products. All sprays, lotions, and washes should be used according to manufacturer's directions. Avoid skin contact with objects or protective clothing that may have touched the plants (plants may still be poisonous even if the leaves have dropped). Every surface that may have touched the plant should be considered contaminated; practice contamination avoidance.

When working in an area known to have ticks, use Permethrin on clothing, gear, and in vehicles. Commercially available insect repellant containing diethyltoluamide (DEET) or Picaridin should be used on exposed skin when working in areas that may have ticks or mosquitoes. Pant legs should be tucked into boots. Personnel should search their entire body for ticks every three or four hours. Any ticks found should be removed promptly and carefully without crushing, since crushing can squeeze the disease-causing organism into the skin. A gentle and steady pulling action should be used to avoid leaving the head or mouth parts in the skin (Attachment B). While removing ticks, hands should be protected with surgical gloves. Avoid wearing the same clothing over multiple days without using Permethrin or laundering. A hot dryer for 10 minutes will kill ticks that remain on clothing.

3.8.3.3 Personnel Training for Biological Hazards

Increased personal awareness of biological hazards is an essential part of hazard prevention. Personnel training regarding these hazards will meet the following requirements.

- All personnel will be briefed on identifying poisonous plants and dangerous animals, including snakes, insects, spiders, and scorpions.
- All personnel will be briefed on the hazards of ticks before starting work on OU-1/OU-2 using the CDC fact sheet and tick removal instructions found in Attachment B.
- All personnel will be briefed on the protective method(s) used to control exposures to biologicals and the requirements they will need to know and implement.

- All personnel will be briefed on the first aid and medical treatment procedures found in Section 3.8.3.4 prior to starting work on-site.

3.8.3.4 First Aid and Medical Treatment for Biologicals

Most encounters with biologicals can be effectively treated with first aid immediately following exposure. Snake bites, brown recluse or black widow bites, and any apparent severe allergic reaction should be treated as an immediate medical emergency; the person should be immediately transported to the nearest emergency medical facility. First aid for most bites, except for snake bites, consists of applying ice packs and washing the area around the wound.

For snake bites, get the person to the hospital (emergency room) as quickly as possible (within 30 minutes). Apply a pressure immobilization bandage over the bitten area and around the limb. Apply the bandage firmly enough to compress tissues, but not so firmly as to restrict the flow of blood to the limb below the bandage. Bandage from the bite to the fingers or toes, then up to the armpit or groin. Bandage as much of the limb as possible. Be prepared to carry out expired air resuscitation (EAR)/cardiopulmonary resuscitation (CPR) if breathing or circulation fails. Take a photograph of the snake, if possible, to identify the species. As a precaution, do not catch or handle a snake unless it can be unequivocally determined the snake is not venomous. For a short time after a snake is killed, its reflexes may continue to work and can cause a bite, so do not handle a freshly killed venomous snake. Although medical professionals do not agree on every aspect of what to do for snakebite first aid, they are nearly unanimous in their views of what not to do. The following are among their recommendations of what not to do in the case of a snake bite:

- Never wash the venom off the skin; the venom will help identify what type of snake is involved. Emergency decontamination procedures do not apply.
- Never cut or excise the bitten area. Such measures have not been proven useful and may cause further injury.
- Never try to suck the venom out of the wound.
- Never use a constrictive bandage or tourniquet. This cuts blood flow completely and may result in loss of the affected limb.
- Never ice or place any other type of cooling on the bite. Research has shown this to be potentially harmful.

Personnel who have a known allergy to bee stings should carry their own EpiPen® (available by prescription from a personal physician) and be trained in its use. Any person who is stung by a bee, hornet, or scorpion should be given first aid—washing the bite and treating with an ice pack as soon as possible—and be observed for a possible allergic reaction. Although rare, tick bites and poisonous plants can also trigger a severe allergic reaction. The following are symptoms of a severe allergic reaction:

- Sudden raised, red areas (hives) all over the body
- Swelling of the throat, mouth, lips, or tongue

- Trouble breathing
- Passing out (losing consciousness), lightheadedness, sudden weakness, confusion, or restless

Anyone with a known or observed severe allergic reaction must be transported for emergency medical care as soon as possible. If a severe allergic reaction is suspected, the person stung or bitten should use epinephrine (EpiPen®) if it is available. Using the epinephrine auto-injector as a precaution is not harmful, and it could save a life. If epinephrine is administered, the person must be transported for emergency medical care as soon as possible.

Although they do not need to be treated as a medical emergency, larger animal (e.g., dog, raccoon, skunk, rat) bites or scratches should be seen by a medical professional. Insect or spider/scorpion bites should be seen by a professional if they appear to become infected or cause a rash or fever.

Poisonous plant rashes are usually not life threatening. If a poisonous plant rash appears, keep it clean, dry, and cool. Calamine lotion, diphenhydramine, or hydrocortisone can help control itching. Cool compresses or baths with baking soda or oatmeal can also soothe the rash. Don't scratch. Scratching won't spread the rash, but it can cause scars or infection. Seek medical treatment if the rash is close to the eyes or is widespread over the body. Seek emergency treatment if there is a severe allergic reaction in addition to the rash (e.g., nausea, fever, shortness of breath, extreme soreness at the rash site, swollen lymph nodes). Call 911 if there is any trouble breathing or feeling faint.

Other concerns associated with ticks, biting and stinging insects, spiders, and scorpions are infection in the bite wound and exposure to pathogens causing the delayed on-set of illness (up to 30 days after exposure), especially for tick- and mosquito-borne diseases. Depending on how long the tick was embedded and whether a bull’s-eye rash develops, the Site worker may seek nonemergency medical treatment. If the affected person develops an infection or rash at the bite/sting site (prolonged tenderness or swelling, persistent redness, oozing, or discoloration) or manifests symptoms indicative of illness (neck stiffness, muscle twitching, headache, fever, joint pain, rash, back pain, fatigue, swollen lymph nodes, marks at the bite wound site), that person should seek medical attention as soon as possible.

3.8.4 Carbon Monoxide

Carbon monoxide (CO) is a significant hazard when working indoors with equipment powered by any type of gasoline, diesel, or liquid petroleum gas. A single generator, propane heater, or propane fork truck can quickly generate CO above the permissible exposure level (PEL) regardless of the size of the room. The following guidelines will be implemented to mitigate any CO issues:

- Use remotely powered equipment whenever possible.
- Validate that the exhaust from the generating unit is not being sucked or blown back into the building.
- Use an approved exhaust extension for stationary work. Run the extension to the outside of the building.

- Do not use unvented gas or kerosene space heaters in enclosed spaces.
- Do not sit in running cars for extended periods of time; if it is necessary to be in an idling vehicle, leave windows partially opened.
- When operating any fossil-fueled equipment indoors, ensure that all preoperation equipment checks are completed and the equipment is running to specifications. Smokey exhaust, sputtering, backfires, etc., indicate an equipment problem requiring immediate service.
- Provide ventilation within the building regardless of the weather outdoors. Open vents and intakes as well as entry and overhead doors.
- Use large fans to move air into or out of the building. Sometimes better results can be achieved by blowing air out than bringing it in. For stationary work, be sure to move fresh air through the worker breathing zone.
- Operate a properly calibrated CO meter (such as the MultiRAE) within the worker breathing zone before, during, and after equipment operation. Recognize that a CO alarm requires immediate action. Stop work, shut down engines, and move to the outdoors until the alarm subsides and it is safe to reenter. Exposure guidelines for CO are listed in Table 3-4.

Table 3-4. Carbon Monoxide Exposure Guidelines

Parameter	Reading in Work Area/ Worker Breathing Zone	Action
Carbon Monoxide	0 ppm to 20 ppm > 20 ppm	Normal operations; continue monitoring Stop work, evacuate confined space/work area, investigate cause of reading, and ventilate area

Guidance is modified from the OSHA PEL of 50 ppm (8-hour TWA) and a peak CO level during cargo loading and unloading is 200 ppm (https://www.osha.gov/OshDoc/data_General_Facts/carbonmonoxide-factsheet.pdf).

Note: ppm: parts per million (v/v)

3.8.4.1 Symptoms of Carbon Monoxide Exposure

CO is called the silent killer because it has no odor and it slowly overcomes those who are overexposed. Symptoms include headache, fatigue, shortness of breath, nausea, and dizziness. Personnel in the same room may or may not have all symptoms simultaneously. As with all work, use the buddy system to keep each other safe and observe signs and symptoms of overexposure.

3.8.4.2 Treatment of Carbon Monoxide Exposure

Personnel who are or may be experiencing any of the symptoms of CO poisoning, must notify others in the area and get fresh air immediately. Windows and doors should be opened for more ventilation, any combustion equipment should be turned off, and the building should be evacuated. Exposed personnel should seek medical treatment if symptoms persist; overexposure can result in

loss of consciousness and death. A doctor should be contacted immediately for a proper diagnosis and told that CO poisoning may be the reason for symptoms. Prompt medical attention is important if any individuals experience symptoms of CO poisoning while operating fuel-burning devices.

3.8.5 Fatigue Management

It is important that all workers are aware of the hazards related to fatigue. Fatigue can be due to work hours or from other activities that affect work capability. Fatigue can be defined as an increasing difficulty in performing physical or mental activities. Signs of fatigue can include tiredness, changes in behavior, loss of energy, and reduced ability to concentrate. Fatigued Site personnel might have a reduced ability to recognize or avoid risks on the work area. Fatigue can occur at any time when working and could cause safety concerns due to decreased manual dexterity, reaction time, and alertness.

Fatigue results from insufficient rest and sleep between activities. Contributing factors to fatigue can include the following:

- The time of day that work takes place
- The length of time spent at work and in work-related duties
- The type and duration of a work task and the environment (e.g., weather conditions and ambient noise) in which it is performed
- The quantity and quality of rest obtained prior to, during, and after a work period
- Non-work activities
- Individual factors such as sleeping disorders, medications, or emotional state

Personnel suffering from fatigue can exhibit both physical and mental effects, such as the following:

- Slower movements
- Poor coordination
- Slower response time to interaction
- Bloodshot eyes
- Slumped or weary appearance
- Nodding off
- Distractedness or poor concentration
- Inability to complete tasks
- Fixed gaze
- Appearing depressed, irritable, frustrated, or disinterested

Site workers are strongly encouraged to get sufficient rest, maintain sufficient nutritional intake during work (i.e., eat and drink at regular intervals), and communicate with team members and leaders if their level of fatigue increases.

Use the following procedures to help detect and address fatigue-related issues:

- Periodically observe and query coworkers for signs or symptoms of fatigue.
- Site personnel that express concern over their level of fatigue or that are observed to be fatigued such that there is an increased risk of an incident, will be relieved or their work tasks will be adjusted so that they may rest sufficiently.
- Work schedules will consider fatigue factors and optimize continuous periods available for uninterrupted sleep. In case of an emergency or operational difficulties, work hours mighty require adjustment.
- Maintain a routine exercise program and regular sleep schedule as much as possible over the course of the work.
- Avoid heavy meals or caffeine and minimize or eliminate the consumption of alcohol and nicotine before sleeping.

3.8.6 Sunlight and Ultraviolet Exposure

Observe the following procedures and practices regarding ultraviolet (UV) exposure:

- Protect against extended exposure to sunlight with shade, long clothing, sunscreen, and high-SPF, broad-spectrum sunscreen applied frequently.
- Plan work to avoid unnecessary UV exposure.
- During peak daylight months, plan work for early morning or evening.
- Many factors affect the hazards associated with UV exposure, including the following:
  - **Time of day:** UV rays are strongest between 10 am and 4 pm.
  - **Season of the year:** UV rays are stronger during spring and summer months.
  - **Distance from the equator (latitude):** UV exposure goes down as you get farther from the equator.
  - **Altitude:** More UV rays reach the ground at higher elevations.
  - **Cloud cover:** The effect of clouds can vary. Sometimes cloud cover blocks some UV from the sun and lowers UV exposure, while some types of clouds can reflect UV and increase UV exposure. What is important to know is that UV rays can get through, even on a cloudy day.
  - **Reflection off surfaces:** UV rays can bounce off surfaces like water, sand, snow, pavement, or grass, leading to an increase in UV exposure.
- Cloud cover does not necessarily protect from UV exposure. Consider monitoring the UV index for your work area: http://www2.epa.gov/sunwise/uv-index.

- Evaluate site-specific factors affecting UV exposure and address work practices as appropriate.

3.8.6.1 Signs, Symptoms, and Treatment

The best way to treat sunburn is to prevent it using the guidelines listed in the bullets above and in Signs of sunburn include the following:

- Pinkness or redness
- Skin that feels warm or hot to the touch
- Pain, tenderness, or itching
- Swelling
- Small, fluid-filled blisters, which may break
- Headache, fever, chills, and fatigue if the sunburn is severe

If signs of sunburn are noticed, avoid further exposure, and immediately implement treatment. If the sunburn is blistering *and* covers 15% or more of the body, seek medical attention.

3.8.6.2 Prevention

UV exposure hazards and their impacts on each worksite should be evaluated to determine the best practices for risk mitigation. The most effective way to prevent skin damage from UV exposure is to protect bare skin from the exposure. This can be accomplished with shade, clothing (e.g., pants, long sleeves, or hats), sunscreen, and sunglasses. Plan work to either create shade or take advantage of natural shade, and avoid peak UV times during the day when possible. When working outdoors, eye protection should also be chosen to be protective of UV light.

3.9 OU-1/OU-2 Facilities

3.9.1 Sanitation

OU-1/OU-2 sanitation will be maintained according to appropriate federal, state, and local requirements as described in the following sections.

3.9.2 Break Area

Breaks must be taken away from the active work area. Smoking, eating, drinking, or chewing gum or tobacco will only be permitted in designated areas. Gloves should be removed before handling food, drink, or tobacco products.

3.9.3 Potable Water

The following rules regarding potable water apply to all field operations:

- An adequate supply of potable water will be provided for each work area. Potable water must be kept away from hazardous materials and media and contaminated clothing and equipment.

- Portable containers used to dispense drinking water must be capable of being tightly closed and must be equipped with a tap dispenser. Water must not be consumed directly from the container (drinking from the tap is prohibited) or removed from the container by dipping.
- Containers used for drinking water must be clearly marked and must not be used for any other purpose.
- Disposable drinking cups must be provided. A sanitary container for dispensing cups and a receptacle for disposing of used cups is required.

3.9.4 Sanitary Facilities

Access to facilities for washing before eating, drinking, or smoking, or alternative methods such as waterless hand cleaner and paper towels, will be provided.

3.9.5 Lavatory

If permanent toilet facilities are not available, an appropriate number of portable chemical toilets will be provided. This requirement does not apply to mobile crews or to normally unattended OU-1/OU-2 locations so long as personnel at these locations have transportation immediately available to nearby toilet facilities.

3.9.6 Emergency Equipment

Adequate emergency equipment for the activities being conducted at the work site and as required by applicable sections of 29 CFR 1910 and 1926 will be on-site prior to commencing project activities. Personnel will be provided with access to emergency equipment including, but not limited to, the following:

- Fire extinguishers of adequate size, class, number, and location as required by applicable sections of 29 CFR 1910 and 1926 (see HS 508 in Attachment B).
- Industrial first aid kits of adequate size for the number of personnel at the work site. The minimum requirements for a first aid kit are included on the form included as Attachment A.7 (First Aid Kit Contents).
- Emergency eyewash and/or shower, if required by operations being conducted.

4. HAZARDS AND CONTROL MEASURES

The following subsections identify potential health, safety, and environmental hazards associated with anticipated field activities. Because of the complex and changing nature of field projects, all personnel must continually inspect OU-1/OU-2 to identify hazards that may affect personnel, the community, or the environment. The SSO must be aware of these changing conditions and discuss them with the Project Manager (or Task Manager) whenever these changes impact personnel health, safety, the environment, or performance of the project. The SSO will keep personnel informed of the changing conditions and the Project Manager (or Task Manager) will write and/or approve JSAs, addenda, or revisions to this OU-1/OU-2 RD/RA HASP as necessary.

The following subsections address activities that are expected to take place on OU-1/OU-2. Additional procedures to address certain hazards not specifically covered in this OU-1/OU-2 RD/RA HASP are included in Attachment B. As discussed in Section 3.2, all new or changed OU-1/OU-2 activities will require a JSA (Attachment A.2) to specifically identify and address task-specific hazards. To the extent that the JSA can reference the procedures in this OU-1/OU-2 RD/RA HASP and in Attachment B, it will. If additional procedures or updates to procedures are needed to address the task-specific hazard(s), new procedures may need to be prepared and included as a part of the JSA. Procedures will be developed and reviewed by personnel familiar with the activities and objectives of the task. In all task-specific activities, if the JSA differs from the HASP, the JSA will specifically state what procedures will be used and the JSA will be the governing document for that work.

4.1 Utility Clearance

Utility clearance includes identifying aboveground and underground utilities. Prior to any intrusive activities or bringing any heavy equipment toOU-1/OU-2, utility clearance will be conducted.

Damaging an underground or aboveground utility or structure can result in serious injury and loss of life, disrupt essential services, and create significant liability. A minimum of three reliable lines of evidence are required for an acceptable underground utility clearance. All lines of evidence used during the utility clearance procedure will be recorded on the Underground/Overhead Utility Checklist (Attachment A.8). If the location of an underground utility cannot be reliably established with three lines of evidence, a nondamaging intrusive method (soft dig method such as digging by hand or with an air-knife or hydro-knife), will be used to positively identify the location of the utility without damaging it. The lines of evidence used in locating the underground utility will be reasonable and appropriate for the conditions expected to be encountered (e.g., soil type, water table) and the type of utilities expected to be encountered (e.g., gas line versus an irrigation line). No intrusive underground work using mechanical equipment will be allowed within 30 inches on an underground utility without first confirming the location of the utility with a soft dig method.

4.1.1 Utility Clearance Training

The person(s) responsible for utility clearance will have proper training and at least one year of experience with identifying and clearing of subsurface utilities under the direct supervision of a trained and qualified supervisor.

4.1.2 Underground Utilities

Prior to beginning work, underground utilities near the work area(s) will be identified using the following three lines of evidence:

- Contact the State One Call service (in Alabama One Call is 811). Note that One Call service is only reliable in public rights-of-way or easements and requires a 48-hour notice period not including weekends and holidays. Work on privately owned property cannot rely on One Call information.
- Obtain a detailed utility plan drawn to scale, preferably an as-built plan.
- Conduct a visual inspection of the area, looking for evidence of underground utilities including but not limited to the following:
  - Electric conduit going underground from utility poles
  - Transformers
  - Manholes
  - Outdoor lighting
  - Roadway boxes

If one or more of the above lines of evidence cannot be obtained or if the accuracy of the utility location is questionable despite having three lines of evidence, a minimum of one additional line of evidence will be used to locate the underground utility. The following are example additional lines of evidence:

- Private utility-locating service
- Research of state, county, or municipal utility records and maps including computer drawn maps or geographical information systems (GIS)
- The utility provider location records
- Radio frequency detector
- Ground-penetrating radar
- Hand augering or digging
- Hydro-knife
- Air-knife
- Other methods that may give evidence of the presence or location of underground utilities

If the results of the utility location efforts are uncertain or the subsurface activities, such as drilling or excavation, will occur within 30 inches of an underground utility, then excavation must be conducted using a soft dig technique to confirm the location of the utility. If three lines of reliable evidence regarding the utility's location are not maintained during the work, stop work until the underground utility can be located with three lines of reliable evidence.

4.1.3 Aboveground Utilities

Overhead power lines also present risks; the safe clearance distances listed in Table 4-1 must be maintained when working around them:

Table 4-1. Safe Clearance Distances to Powerlines

Power Line Voltage Phase to Phase (kV)	Minimum Safe Clearance (feet)
50 or below	10
Above 50 to 200	15
Above 200 to 300	20
Above 300 to 500	25
Above 500 to 750	35
Above 750 to 1,000	45

From 29 CFR 1926.1408, Cranes and Derricks in Construction, Table A
kV: kilovolts

4.1.4 Utility Strikes

If a utility is struck:

- Immediately call 911 if there is injury or any safety threat.
- Call the utility company.
- Immediately implement protective measures (without putting yourself at risk).
- Notify safety personnel, the Project Manager, and P/S.

4.2 Rail Operations

When working within a railroad right-of-way or within 25 feet of a railroad line, the following procedures will be implemented:

1. Personnel will meet with a representative of the railroad company to determine what standards are required for work on that railroad property, conduct the required job briefing, and log it as a OU-1/OU-2 safety meeting.

2. The details of the procedure in this section will be reviewed with the railroad representative and may need to be modified to ensure that the railroad and Site workers agree to how to conduct work safely.
3. Communication with a railroad representative will be maintained throughout the duration of the work activities. Work will not be conducted unless the railroad representative has given the authorization to proceed.
4. All personnel who may be within 25 feet of any rail system will receive a minimum two hours of safety training specific to the operations expected to be encountered (e.g., railroad-specific training). A hardhat decal or certificate of training indicating the completion of this training will be issued by the SSO.
5. Personnel will not cross tracks immediately after a rail vehicle or train has passed but will wait until adjacent tracks can be observed for a safe distance in both directions.
6. Personnel will not cross tracks directly in front of or behind rail equipment or a train that has just stopped but will cross at least 25 feet in front of or behind the standing train or equipment.
7. Personnel will never step, stand, sit, or walk on any part of the track unless it is absolutely necessary and safe to do so. When required to perform duties in the track areas, walking on or crossing the tracks must be on the cross ties and ballast only.
8. Do not walk or step on rails, switches, guardrails, interlocking machinery, or movable connections.
9. Personnel should expect rail vehicle and train movement at any time and from any direction. Look in each direction prior to entering a trackway area.
10. All work must be stopped while trains are passing within the work zone.
11. Prior to moving any high rail vehicle, locomotive, or powered equipment, a warning whistle, horn, or similar device will be sounded to warn those in the area.
12. Before permitting personnel to be on the track, the Field Operation Lead will instruct all crew members as to where each person will go when it is necessary to clear the track. All personnel will clear the track on the same side.
13. All personnel working on or near the tracks will wear a fluorescent green or orange (white or silver at night) reflective traffic vest capable of being seeing from 360 degrees.
14. All hoses, electrical cords, and other similar equipment will be kept clear of the tracks(s). If such equipment must be placed across a track, it will be run under the rail.
15. All vehicles will be kept at least 25 feet away from any active track.
16. No personnel will work within 25 feet of any active track without authorization.
17. All overhead wires will always be considered energized.
18. Personnel must not touch dangling wires or foreign objects hanging from such wires nor attempt to move them by any means. They will report the location(s) immediately

and, if possible, leave someone to guard the wires or foreign objects until a qualified person can remove the wires or objects.

19. Loose or broken impedance bond connections in the tracks will be regarded as energized and reported immediately.
20. When an overhead wire failure occurs that may obstruct tracks, notify the railroad, and ensure that all personnel in the area are protected from the potential danger.
21. If you must walk on or along the tracks, always face the direction of oncoming train traffic. Occasionally look back in case traffic should reverse. Check work area for safe locations to go when tracks must be cleared.
22. Avoid crossing tracks near or at switch points or crossovers. Never step on moving parts of switch points, turnouts, or crossovers. Always walk on ties, inverts, or walkways.
23. Personnel will not jump off platforms to gain access to tracks. Personnel must use ladders or platform stairs.
24. All tools used on or near electrical equipment or circuits will be adequately insulated. Fuse pullers will be used for removing and replacing fuses. Electrical equipment and circuits will be deenergized before any work is performed in accordance with HS 119 (Attachment B) requirements.
25. Use only a dry cloth or fiberglass measuring tape near electric lights/power wires near operating tracks. Be sure the dry cloth tapes do not contain metallic threads.
26. All personnel are to stay clear of the overhead catenary wire as it is usually charged with 1,500 volts DC. This wire should be treated as live at all times. All test holes or pits less than 15 feet from the centerline of main tracks will be filled or covered prior to passing of trains. No open pits or holes will be left over night. All pits and trenches will be shored according to OSHA requirements in the excavation standard.
27. No personnel will embark or disembark equipment in motion.
28. When working at a stationary location, a flagger will be posted to warn oncoming rail equipment, trains, or other vehicles to slow or stop.
29. Prior to performing any work on or near the rail tracks, a flagger will be posted at least 100 feet in each direction along the track to warn oncoming equipment to slow down.
30. The Field Operation Lead will ensure that each person serving as a flagger has documented instruction in proper flagging procedures and is reliable and competent.
31. A written procedure will be developed to ensure coordination and communication between workers and flaggers.
32. The flagger will be equipped with the following mandatory equipment:
    a. A paddle with “SLOW” on one side and “STOP” on the other side
    b. A horn
    c. A fluorescent green or orange reflective traffic vest (white or silver at night)

d. A radio with the ability to communicate with the on-track equipment

e. An orange flag

33. When approaching a flagger waving an orange flag in a horizontal (side to side) motion, the equipment operator will stop the equipment and receive instructions from the flagger prior to proceeding.

34. A flagger will be posted at all vehicular and pedestrian traffic crossings to ensure a clear crossing.

35. When working near any rail tracks, personnel must be alert to the movement of the on-track equipment. This equipment might be located on either track and might be moving in either direction. Treat all rail tracks as active.

4.3 Road and Traffic Safety

Work next to or in roadways should be avoided whenever possible. If working in or near roadways cannot be avoided, a traffic safety plan will be written and followed. Components of a traffic safety plan are outlined in HS 517 in Attachment B and may include any appropriate combination of the following: road closures, barriers, signs, cones, police detail, and flaggers. At a minimum, the traffic safety plan will be discussed with local officials and documented before implementation. Similarly, any traffic considerations associated with the loading or moving of trucks to transport materials to or from areas of OU-1/OU-2 will be discussed with local officials and documented prior to implementation.

4.4 Soil Borings and Monitoring Well Installation

These tasks include installing soil borings and monitoring wells at specified locations. Soil samples will generally be collected using direct-push boring equipment (Geoprobe® or equivalent) or a conventional drill rig. Monitoring wells typically will be installed using a conventional drill rig. The general hazards for using these equipment types are described below recognizing the task-specific JSAs must account for the specifics of the planned work, including the possibility that the work related to soil boring and monitoring well installation could be conducted using other equipment types.

4.4.1 Geoprobe® Hazards and Control Procedures

4.4.1.1 Geoprobe® Hazards

The primary physical hazards for direct-push boring are associated with using the Geoprobe® equipment. The equipment is hydraulically powered and uses static force and dynamic percussion force to advance small-diameter sampling tools. Noise exposure, especially when using the equipment all day, is an issue. There is the potential for personnel to be struck by or to strike against objects resulting in fractures, lacerations, punctures, or abrasions. Manual materials handling can cause blisters, sore muscles, and joint and skeletal injuries and can present eye, contusion, and laceration hazards.

Accidents can occur if the equipment is improperly placed on uneven or unstable terrain or if the equipment is not adequately secured prior to the start of operations. Overhead utility lines and

underground installations such as electrical lines, conduit, and product lines pose a significant hazard if contacted. Another hazard to watch for is slippery work surfaces that can increase the likelihood of back injuries, overexertion injuries, and slips and falls. Additionally, the boring equipment also produces impact noise from the action of the soil-probing hammer. Common accidents that occur in material handling operations are the "caught between" situation when a load is being handled and a finger or toe gets caught between two objects and lacerations from opening the sampling sleeves.

4.4.1.2 Control of Geoprobe® Hazards

The equipment operator must hold the required state or local licenses to perform such work. All members of the crew will receive OU-1/OU-2-specific training prior to beginning work.

The equipment operator is responsible for the safe operation of the rig, as well as the crew's adherence to the requirements of this OU-1/OU-2 RD/RA HASP. The equipment operator must ensure that all safety equipment is in proper condition and is properly used. The members of the crew must follow all instructions of the equipment operator, wear all PPE, and be aware of all hazards and control procedures. The equipment operator and crew must participate in the daily safety meetings and be aware of all emergency procedures.

Each day, prior to the start of work, the equipment operator must inspect the rig and associated equipment. The following items must be inspected:

- Vehicle condition
- Proper storage of equipment
- Condition of all hydraulic lines
- Fire extinguisher
- Eyewash kit
- First aid kit

Prior to deploying the equipment, the equipment operator will inspect all sampling locations to verify a stable surface exists. This is especially important in areas where soft, unstable terrain is common. Prior to beginning work, the rig must be properly leveled, and the wheels must be chocked. Be sure all utilities clearance procedures (Section 4.1) have been properly followed prior to any intrusive field work.

Appropriate PPE should be worn when working with and around the Geoprobe®. PPE should include hearing protection, appropriate footwear, and gloves. If opening sample sleeves for sample collection, both chemical resistant and cut resistant gloves (e.g., Kevlar®) are appropriate. Dermal exposure can be controlled during sampling activities by wearing a minimum of Level D protection. Avoid placing tools and equipment on the ground to minimize contact with poisonous or irritating flora and fauna. If needed, air monitoring may be conducted when using a Geoprobe® to assess the potential for exposure to airborne COCs. If the results of air monitoring indicate the presence of organic vapors in a concentration causing concern, personnel will upgrade to Level C

protection. Air monitoring requirements and action levels are described in Section 6 (Air Monitoring). Each level of personal protection is described in Section 5 (Personal Protective Equipment). If air monitoring or Level C protection is required, the requirements and how they will be met will be specifically addressed in an activity-specific JSA (Section 3.2).

If equipment is operated near overhead power lines, the power to the lines must be shut off or the equipment must be positioned and blocked such that no part, including cables, can come within the minimum clearances as shown in Table 4-1 (Section 4.1).

4.4.2 Conventional Drilling

4.4.2.1 Drilling Hazards

The primary physical hazards for drilling are associated with the using the drilling rig. Rig accidents can occur if the rig is improperly placed on uneven or unstable terrain or if the equipment is not adequately secured prior to the start of operations. Underground and overhead utility lines can create hazardous conditions if contacted by drilling equipment. Tools and equipment (e.g., elevators, cat lines, and wire rope) have the potential for striking, pinning, or cutting personnel. Worn or frayed wire rope presents a laceration hazard if loose wires protrude from the main bundle. Noise exposure is also a hazard around all heavy equipment.

Cat lines are used on drilling rigs to hoist material. Accidents that occur during cat line operations may injure the person doing the rigging as well as the rig operator. Minimal hoisting control causes sudden and erratic load movements, which may result in hand and foot injuries.

Another hazard to watch for are slippery work surfaces that can increase the likelihood of back injuries, overexertion injuries, and slips and falls. Additionally, pipes and/or rolling stock can shift and/or fall from a pipe rack or truck bed. The most common type of accident in material handling operations is the "caught between" situation when a load is being handled and a finger or toe gets caught between two objects. There is the potential for personnel to be struck by or to strike against objects resulting in fractures, lacerations, punctures, or abrasions. Manual materials handling can cause blisters, sore muscles, and joint and skeletal injuries and can present eye, contusion, and laceration hazards.

4.4.2.2 Control of Drilling Hazards

All drillers must hold required state or local licenses to perform such work. All members of the drill crew will receive OU-1/OU-2-specific training prior to beginning work.

The driller is responsible for the safe operation of the drill rig as well as the crew's adherence to the requirements of this OU-1/OU-2 RD/RA HASP. The driller must ensure that all safety equipment is in proper condition and is properly used. The members of the crew must follow all instructions of the driller, wear all PPE, including hearing protection, and be aware of all hazards and control procedures. The drill crews must participate in the daily safety meetings and be aware of emergency procedures.

Each day prior to the start of work, the driller and/or drill crew must inspect the drill rig and associated equipment. The following items must be inspected:

- Drill rig condition
- Proper storage of equipment
- Condition of all wire rope
- Fire extinguisher
- Eyewash kit
- First aid kit

The drill rig must be properly blocked and leveled prior to raising the derrick. Blocking provides a more stable drilling structure by evenly distributing the weight of the rig. Proper blocking ensures that differential settling of the rig does not occur. When the ground surface is soft or otherwise unstable, wooden blocks at least 24 inches wide by 24 inches long and 4 to 8 inches thick will be placed between the jack swivels and the ground. The emergency brake will be engaged, and the wheels that are on the ground will be chocked. The leveling jacks will not be raised until the derrick is lowered. The rig will be moved only after the derrick has been lowered.

The driller will inspect all drilling sites prior to placing the rig to verify a stable surface exists. This is especially important in areas where soft, unstable terrain is common.

Before drilling, the existence and location of underground pipe, electrical equipment, and gas lines will be determined (Section 4.1). If any evidence of a product line or underground utility is encountered, a new sampling location will be selected.

Under no circumstances will personnel ride the traveling block or elevators, nor will the cat line be used as a personnel carrier.

If drilling is conducted near overhead power lines, the power to the lines must be shut off or the equipment must be positioned and blocked such that no part, including cables, can come within the minimum clearances as presented in Table 4-1 (Section 4.1.3).

When the drill rig is in transit, with the boom lowered and no load, the equipment clearance must be at least 4 feet for voltages less than 50 kilovolts (kV), 10 feet for voltages of 50–345 kV, and 16 feet for voltages above 345 kV.

Drillers should never engage the rotary clutch without watching the rotary table and ensuring it is clear of personnel and equipment.

Unless the drawworks is equipped with an automatic feed control, the brake should not be left unattended without first being tied down. Drill pipe, auger strings, or casing should be picked up slowly. Drill pipe should not be hoisted until the driller is sure that the pipe is latched in the elevator or the derrickman has signaled that he may safely hoist the pipe.

During instances of unusual loading of the derrick or mast, such as when making an unusually hard pull, only the driller should be on the rig floor; no one else should be on the rig or derrick.

The brakes on the drawworks of the drill rig should be tested by the driller each day. The brakes should be thoroughly inspected by a competent individual each week.

A hoisting line with a load imposed should not be permitted to be in direct contact with any derrick member or stationary equipment unless it has been specifically designed for line contact.

Personnel should never stand near the borehole whenever any wire line device is being run. Hoisting control stations should be kept clean and controls labeled as to their functions.

Only experienced personnel will be allowed to operate the cathead controls. The kill switch must be clearly labeled and operational prior to operating the cat line. The cat head area must be kept free of obstructions and entanglements.

The operator should not use more wraps than necessary to pick up the load. More than one layer of wrapping is not permitted.

Personnel should not stand near, step over, or go under a cable or cat line that is under tension. Personnel rigging loads on cat lines will engage in the following:

- Keep out from under the load.
- Keep hands and feet where they will not be crushed.
- Be sure to signal clearly when the load is being picked up.
- Use standard visual signals only and not depend on shouting to coworkers.
- Make sure the load is properly rigged (a sudden jerk in the cat line will shift or drop the load).

When two wires are broken or rust or corrosion is found adjacent to a socket or end fitting, the wire rope will be removed from service or resocketed. Special attention will be given to the inspection of end fittings on boom support, pendants, and guy ropes.

Wire rope removed from service due to defects will be cut up or plainly marked as being unfit for further use as rigging.

Wire rope clips attached with U-bolts will have the U-bolts on the dead or short end of the rope; the clip nuts will be retightened immediately after initial load carrying use and at frequent intervals thereafter.

When a wedge socket fastening is used, the dead or short end of the wire rope will have a clip attached to it or looped back and secured to itself by a clip; the clip will not be attached directly to the live end.

Protruding ends of strands in splices on slings and bridles will be covered or blunted.

Except for eye splices in the ends of wires and for endless wire rope slings, wire rope used in hoisting, lowering, or pulling loads, will consist of one continuous piece without knot or splice. An eye splice made in any wire rope will have at least five full tucks.

Wire rope will not be secured by knots. Wire rope clips will not be used to splice rope. Eyes in wire rope bridles, slings, or bull wires will not be formed by wire clips or knots.

Pipe and auger sections will be transported by cart or carried by two persons. Individuals should not carry auger or pipe sections without assistance.

Personnel should not be permitted on top of the load during loading, unloading, or transferring pipe or rolling stock.

Personnel should be instructed never to try to stop rolling pipe or casing; they should be instructed to stand clear of rolling pipe.

Slip handles should be used to lift and move slips. Personnel are not permitted to kick slips into position.

When pipe is being hoisted, personnel should not stand where the bottom end of the pipe could whip and present a hazard striking them.

Pipe and augers stored in racks, catwalks, or on flatbed trucks should be secured to prevent rolling.

4.4.3 Soil Sampling and Processing

4.4.3.1 Soil Sampling and Processing Hazards

Soil sampling involves collecting samples and preparing them for subsequent field and laboratory analysis. The hazards associated with collecting and processing soil samples include the equipment used to conduct these tasks (e.g., power and hand tools) and ergonomic stresses. Manual equipment handling can cause blisters, sore muscles, and joint and skeletal injuries, and can present eye, contusion, and laceration hazards. Walking and working surfaces may involve slip, trip, and fall hazards due to slippery, unstable, and irregular walking surfaces. There are other common hazards associated with soil sampling and processing, including weather (e.g., sunlight, heat or cold, lightning, rain), and pathogens (e.g., fecal coliform, blood-borne pathogens).

Chemical hazards include the inhalation and absorption (contact) of COCs with the primary routes of entry associated with handling soils and equipment, manual transfer of the soil into sample containers, and proximity of operations to the breathing zone. If needed, air will be sampled in accordance with procedures outlined in Section 6. The results of air sampling may dictate upgrading to Level C PPE (Section 5.3).

4.4.3.2 Control of Soil Sampling and Processing Hazards

OU-1/OU-2 conditions will be identified in the task-specific JSAs and discussed with all personnel before initiating any activities. Hazards will be identified, and protective measures will be explained in the JSAs, and equipment will be inspected to confirm that it’s in proper working

condition before use. Extreme care will be taken when opening soil core liners using hand tools. PPE will initially be Level D or Modified Level D as outlined in Section 5.1 and 5.2. Air sampling in the processing area will be conducted in accordance with procedures outlined in Section 6. The results of air sampling may dictate upgrading to Level C PPE. Potential contact with biological hazards during soil sampling will be avoided using the procedures presented in Section 3.8.3.

4.4.4 Groundwater Sampling

Groundwater sampling involves collecting samples and preparing them for subsequent field and laboratory analysis. Many of the physical hazards of groundwater sampling are associated with the equipment, sample collection methods, procedures used, and the OU-1/OU-2 environment. Specific groundwater sampling hazards include use of hand tools, ergonomic stresses, and exposure to chemical and biological hazards. Manual equipment handling and lifting can cause blisters, sore muscles, and joint and skeletal injuries, and can present eye, contusion, and laceration hazards. Walking and working surfaces may involve slip, trip, and fall hazards due to slippery, unstable, and irregular walking surfaces. There are other common hazards associated with groundwater sampling and processing, including weather (e.g., sunlight, heat or cold, lightning, rain) and pathogens (e.g., fecal coliform, blood-borne pathogens).

Chemical hazards include the potential inhalation and absorption (contact) of COCs, and the primary routes of entry are associated handling the groundwater samples and equipment during the collection or transfer of groundwater into sample containers, and the general proximity of operations to the breathing zone. If needed, air will be sampled in accordance with procedures outlined in Section 6. The results of air sampling may dictate upgrading to Level C PPE (Section 5.3).

4.4.4.1 Control of Groundwater Sampling Hazards

OU-1/OU-2 conditions will be identified in the task-specific JSAs and discussed with all personnel before initiating any activities. Hazards will be identified, protective measures will be explained in the JSAs, and equipment will be inspected to confirm that it is in proper working condition before use. Extreme care will be taken when connecting and disconnecting groundwater sampling equipment and handling preservatives that may be added to the samples. PPE will initially be Level D or Modified Level D as outlined in Section 5.1 and 5.2. Air sampling in the processing area will be conducted in accordance with procedures outlined in Section 6. The results of air sampling may dictate upgrading to Level C PPE. Potential contact with biological hazards during groundwater sampling will be avoided using the procedures presented in Section 3.8.3.

4.5 Sediment Sampling and Processing

Sediment sampling involves collecting samples and preparing them for subsequent field and laboratory analysis. For waters deeper than 2 to 4 feet, vibracoring and manual coring methods may be used to conduct this work.

In general, the primary hazards for sediment sampling include the following:

- Working near and around water (drowning, hypothermia) (see HS 306 and HS 312, Attachment B)
- Caught-between injuries
- Ergonomic stresses
- Exposure to chemical and biological (waterborne bacteria and microorganisms) hazards, extreme weather, plants, and insects

The following are the primary controls for these hazards:

- Use only United States Coast Guard- (USCG-) approved equipment, including boats and personal flotation devices (PFDs) (see HS 306 and HS 312, Attachment B).
- Use the buddy system and internal and external communication systems.
- Assign appropriate PPE for each task.

Additional hazards/controls related to vibracoring and manual coring are described in greater detail below.

4.5.1 Vibracoring/Sediment Sampling

4.5.1.1 Vibracoring Hazards

Working from a boat presents the obvious hazard of drowning, but several other hazards also exist (see HS 306 and HS 312, Attachment B). Other ships and pleasure crafts may be present. Visibility can be hampered due to fog and rain. Water can become rough due to weather or the passing of another vessel. Powered craft carry a fuel supply, which has the potential for fire or explosion if vapors accumulate and reach an ignition source. Weather, currents, and other watercraft may also pose significant hazards to the crew.

Many of the physical hazards of vibracoring activities are associated with the equipment, sample collection methods, procedures used, and the OU-1/OU-2 environment. Specific vibracore hazards include impact from moving parts, pinch points, wire rope, use of a winch or windlass, overhead hazards, and noise. Manual equipment handling can cause blisters, sore muscles, and joint and skeletal injuries, and can present eye, contusion, and laceration hazards. Walking and working surfaces may involve slip, trip, and fall hazards due to slippery, unstable, and irregular walking surfaces. There is the potential for personnel to be struck by or to strike against objects resulting in fractures, lacerations, punctures, or abrasions. Manual materials handling can cause blisters, sore muscles, and joint and skeletal injuries and can present eye, contusion, and laceration hazards.

Inhalation and absorption (contact) of COCs are the primary routes of entry associated with sediment sampling due to the manipulation of sample media and equipment, manual transfer of media into sample containers, and proximity of operations to the breathing zone. If needed, air will be sampled in accordance with procedures outlined in Section 6. The results of air sampling may dictate upgrading to Level C PPE (Section 5.3).

Environmental hazards while conducting vibracore activities from a boat include weather (e.g., sunlight, heat or cold, lightning, rain) and pathogens (e.g., fecal coliform, blood-borne pathogens).

Chemical hazards may include contact with sediment, surface water, or other environmental media containing COCs.

4.5.1.2 Control of Vibracoring Hazards

At a minimum, all personnel working from a boat are required to participate in a boating safety training session conducted prior to beginning field operations. The training session will provide instruction on the following topics:

- Proper boat and safety equipment inspections
- Content and frequency of equipment safety inspections
- Proper use of onboard safety equipment (e.g., fire extinguisher, radio or cellular phone, flares, horn)
- Proper procedures on completing and filing a float plan
- Appropriate boating rules
- Emergency procedures in the event of capsizing or being thrown overboard
- Different types of PFDs and their proper inspection and use

Personnel working over, adjacent to, or near water, where the danger of drowning exists, must wear a USCG-approved PFD. Prior to and after each use, the PFD must be inspected for defects, which could alter its strength or buoyancy. Defective units must be tagged "Do Not Use" and removed from service. Ring buoys with at least 90 feet of line must be provided and readily available for emergency rescue operations. Distance from ring buoys will not exceed 200 feet. At least one boat must be immediately available at locations where personnel are working over or adjacent to water.

Prior to each day or shift of operations, the vessel operator must inspect the vessel. This inspection will be conducted in accordance with accepted USCG inspection procedures and applicable state boating safety inspection procedures. The inspection must verify that necessary safety equipment is aboard and functioning properly and that all members of the crew are aware of proper procedures that are to be followed on the water. In addition, this information will be reviewed during the daily safety meeting to ensure the procedures have been followed and all crew members are satisfied as to their completion.

The SSO is responsible for verifying that the daily boat/equipment inspections are completed and documented and that daily safety meetings are conducted. The following safety procedures will be observed at all times:

- Vessels will not be overloaded with equipment or personnel.
- A minimum of two persons will be onboard during all boat operations.

- Loads will be distributed evenly throughout the vessel.
- Type I, II, or III PFDs will be worn at all times when working on or adjacent to the water.
- All PFDs will be properly inspected to verify that appropriate USCG approvals and ratings information is available.
- At least one Type IV PFD (seat cushion, ring buoy) will be available onboard.
- An audible signal/alarm (capable of being heard up to 0.5 mile away) will be maintained in each vessel.
- Each vessel will be equipped with a ship-to-shore radio, cellular phone, and/or a hand-held, portable, two-way radio transceiver capable of contacting the USCG, marine police, or other onshore station for help in an emergency.
- Each vessel will be equipped with some type of visual display signal/device (e.g., flares or appropriate distress flag).
- All powerboats will have a valid state registration. This registration will be maintained on the boat, and as necessary, be made available for USCG or marine police inspection.
- At a minimum, each powerboat will be equipped with a Type 4-A, 10-B, C-rated fire extinguisher.
- Boats will not be operated at night without proper lighting and the capability for making visual distress signals.
- Personnel who are working from a boat when water temperatures are below 50 °F must be equipped with thermal protective clothing/equipment (e.g., wet suits, dry suits). The thermal protective clothing must be adequate to protect personnel from hypothermic effects of immersion in water at the temperatures encountered.

Prior to initiating any activities, OU-1/OU-2 conditions will be discussed with all personnel. Hazards will be identified, and protective measures will be explained. Equipment will be inspected and in proper working condition. Extreme care will be taken when loading and unloading material and equipment. Proper lifting techniques must be employed, and two-person lifting techniques or mechanical assistance will be provided for lifting heavy items. PPE will initially be Level D or Modified Level D as outlined in Section 5.1 and 5.2. Hearing protection must be used if working near a working generator. Air sampling in the processing area will be performed in accordance with procedures outlined in Section 6. The results of air sampling may dictate upgrading to Level C PPE. Avoidance of biological hazards as discussed in Section 3.8.3 will be implemented.

4.5.2 Manual Coring

Sediment samples may be collected manually from a boat or by wading into the water. This section outlines the precautions that personnel will take in these cases.

4.5.2.1 Manual Coring Hazards

Working from a boat presents the obvious hazard of drowning, but several other hazards exist. Other ships and pleasure craft may be present. Visibility can be hampered due to fog and rain. Water can become rough due to weather or the passing of another vessel. Powered craft carry a fuel supply, which has the potential for fire or explosion if vapors accumulate and reach an ignition source. Weather, currents, and other watercraft may also pose significant hazards to the crew. There is the potential for personnel to be struck by or to strike against objects resulting in fractures, lacerations, punctures, or abrasions. Manual materials handling can cause blisters, sore muscles, and joint and skeletal injuries and can present eye, contusion, and laceration hazards. Other hazards while coring from a boat are similar to those presented in Section 4.5.1 (Vibracoring).

4.5.2.2 Control of Manual Coring Hazards

The manual coring and vibracoring hazard controls are very similar. Given the similarity, refer to Section 4.5.1 for information relative to controls.

Sampling activities may also be conducted using hip waders and the required level of PPE. Prior to donning, waders must be inspected for holes, punctures, tears, or any other defect that would allow water to enter. Personnel must wear a USCG-approved PFD or buoyant work vest during all activities conducted in water. Prior to each use, the PFD or work vest must be inspected for defects that may alter its strength or buoyancy. Defective units must be tagged “Do Not Use” and removed from service. The buddy system will be strictly adhered to during any water-related activities. At no time will anyone enter the water without another individual readily available to contact emergency services.

In addition to the drowning hazards associated with working on or near the water, there exists the possibility for slips, trips, or falls caused by slippery, unstable, and irregular walking surfaces. Waders used for sampling activities must be properly sized and provide the wearer with adequate traction.

PPE will initially be Level D or Modified Level D as outlined in Sections 5.1 and 5.2. Air sampling in the processing area will be performed in accordance with procedures outlined in Section 6. The results of air sampling may dictate upgrading to Level C PPE (Section 5.3).

4.6 Biota Sampling

Biota sampling activities may involve a potential for exposure to physical and health hazards. Hazards may also be associated with OU-1/OU-2 and the environmental conditions present during the collection of these organisms.

4.6.1 Biota Sampling Hazards

The physical hazards of biota sampling activities are primarily associated with the OU-1/OU-2 environment. There is the potential for personnel to be struck by or to strike against objects resulting in fractures, lacerations, punctures, or abrasions. Manual materials handling can cause blisters, sore muscles, and joint and skeletal injuries and can present eye, contusion, and laceration hazards. Walking and working surfaces during sampling activities may involve slip, trip, and fall

hazards due to slippery, unstable, and irregular walking surfaces. Boating and drowning hazards exist and will present potential hazards for personnel working in, or near water or working from a boat or a barge (see HS 306 and HS 312, Attachment B). Electrical hazards are potentially present from electrofishing techniques that may be used to collect fish. Chemical hazards may include contact with soil, sediment, surface water, or other environmental media containing OU-1/OU-2 COCs and potential contact with chemicals used for biota sample preservation and equipment decontamination procedures.

4.6.2 Control of Biota Sampling Hazards

During sampling activities, a minimum of Level D protection will be worn. A USCG-approved PFD will be worn if sampling occurs in open waters. Prior to initiating any biota sampling activities, the OU-1/OU-2 conditions will be discussed with all personnel. Hazards will be identified, and protective measures will be explained. Equipment will be inspected and in proper working condition. Extreme care will be taken when loading and unloading samples and sampling equipment. Proper lifting techniques must be used, and mechanical assistance will be provided for lifting large or heavy items. Safety procedures outlined throughout the document will be implemented. PPE will initially be Level D or Modified Level D as outlined in Section 5.1 and 5.2 with a PFD. If needed, air sampling in the processing area will be performed in accordance with procedures outlined in Section 6. The results of air sampling may dictate upgrading to Level C PPE (Section 5.3). Avoidance of biological hazards (as discussed in Section 3.8.3) will be implemented. Only authorized personnel who have been trained in accordance with the manufacturer's instructions and recommendations will operate equipment.

4.6.3 Electrofishing

Portable electrofishing equipment may be used to collect specimens from various areas of OU-1/OU-2. All unauthorized or nonessential personnel will be moved to a safe distance away from active electrofishing activities. Using electrofishing equipment involves potential hazards related to the high voltage output. Because water is an excellent conductor of electricity, the operator of the electrofisher must observe certain precautions to avoid injury, as discussed below.

The electrofisher sends current through the cathode, through the water, and to the anode. The equipment operator will be shocked if he or she becomes part of the circuit. Touching the cathode and anode simultaneously would complete the circuit and result in a severe electric shock. Touching only one of the electrodes will not result in a shock; nevertheless, operators are not permitted to touch the electrodes. There is a range of effects from electric shock. Those symptoms include muscle contraction (unable to let go), lung paralysis, ventricular fibrillation, heart paralysis, severe burns, and death.

4.6.3.1 General Electrofishing Safety Procedures

The following general safety procedures apply to all types of electrofishers, and should be observed at all times:

- Use electrical lineman gloves of at least a 5,000-volt rating. If the gloves become wet inside, stop electrofishing, and dry the gloves thoroughly.

- Remove wristwatch, rings, and other metal jewelry that is not protected by an insulated material.
- Use only dip nets with insulated or nonconductive handles.
- Make all electrical connections before turning on the power.
- Be sure all personnel are aware that electrofishing is going to begin and that they are clear of electrodes before turning on the power.
- Confirm the equipment includes a switch that keeps the circuit open unless actively and continuously closed. The operator also will have access to an emergency shut-off switch.
- Operate within acceptable power ranges to prevent overloading the equipment and minimize the potential of fire hazard.
- During electrofishing, the high-voltage flashing light and/or audible tone generator should be working.
- Do not touch people, equipment, or metal objects with the anode or cathode probes/surfaces.
- Wear polarized sunglasses to detect subsurface hazards and obstacles.
- Turn the power off immediately if a problem occurs and when the unit is not in use.

4.6.3.2 Backpack Electrofishers

For backpack electrofishers, the following safety procedures, including the general procedures listed above, should be observed at all times:

- Use water-tight wading hip boots or chest waders. If the waders or boots become wet inside, stop electrofishing, and dry the waders or boots thoroughly.
- Operate slowly and carefully to prevent tripping on objects in the stream.
- Stop sampling if persons, pets, or livestock are observed in the water or on shore within 40 feet of the electrofishing unit.
- Do not touch the cathode with the anode. This prevents overloading the unit.
- Check that the mercury tilt switch shuts off the power when the unit is tipped more than 45° from vertical.
- Use careful body positioning to avoid back strain (backpack electrofishers add a burden to the user).

4.7 Chemical Hazards

The chemical hazards associated with OU-1/OU-2 activities are related to inhalation, ingestion, and dermal exposure to soil, sediment, surface water, and groundwater containing COCs. Although PCBs are the primary COC at OU-1/OU-2, other constituents may be encountered in areas influenced by sources other than the Facility (e.g., unapproved waste disposal areas). The potential

for exposure to known and unknown chemicals varies depending on the location within OU-1/OU-2 and will be evaluated and prepared for in individual JSAs. Chemicals are also routinely used in support of investigation and remediation activities (e.g., sample preservation, wastewater treatment). Exposure to chemicals will be minimized by using safe work practices and by wearing the appropriate PPE. A further discussion of PPE requirements is presented in Section 5.

The SDSs for chemicals used in conducting the work shall be attached to the JSAs. Chemicals brought to OU-1/OU-2 will be collected and accumulated in a central location. SDSs will be readily available to Site personnel.

4.8 Spill Control

All personnel must take every precaution to minimize the potential for spills during OU-1/OU-2 activities. On-site personnel must immediately report spills to the SSO.

Spill control equipment and materials will be located on-site in the areas that present the potential for spills. All sorbent materials used to clean up spills will be containerized and labeled appropriately. In the event of a spill, follow guidelines in the SDS sheets, contain and control released materials, and prevent their spread to off-site areas. See Section 10.1.7 for additional information on spill control procedures.

4.9 Lockout/Tagout Procedures

LO/TO procedures are necessary when working around or with a variety of equipment and energy sources that can present significant life-threatening hazards to personnel. Unexpected start-up of equipment or exposure to hazardous energy must be controlled. Activities involving locking out or tagging out must have and follow a written LO/TO program that includes provisions to meet 29 CFR 1910.147. LO/TO also requires a CP and associated training for all affected personnel. The LO/TO program is included in HS 119 (Lockout/Tagout Program) in Attachment B. All LO/TO will be implemented in accordance with this program or with an authorized subcontractor's program

Lockout is the placement of a device that uses a positive means, such as lock, to hold an energy or material-isolating device such that the equipment cannot be operated until the lockout device is removed. If a device cannot be locked out, a tagout system will be used. Tagout is the placement of a warning tag on an energy- or material-isolating device indicating that the equipment controls may not be operated until the tag is removed by the person who attached the tag. Locks and tags will be issued to authorized personnel. Personnel involved in LO/TO activities must be trained according to their role and level of responsibility. In LO/TO procedures there are two types of personnel: authorized personnel and affected personnel.

Authorized personnel are the personnel who are trained and experienced in the hazards and control measures and who lockout or tagout machines or equipment to perform servicing or maintenance on that machine or equipment. Authorized personnel possess the skills, knowledge, and certifications to implement the LO/TO program.

Affected personnel are those whose job requires him or her to operate or use a machine or equipment on which service or maintenance is being performed under LO/TO, or whose job requires him or her to work in an area where such servicing or maintenance is being performed. Personnel who may work on or around equipment that may use the LO/TO procedure are considered affected Site workers unless they are specifically prevented from doing so. Affected personnel are not allowed to LO/TO equipment or work on machines or equipment when the guards have been removed. Affected personnel become authorized personnel when their duties include performing servicing or maintenance covered under this section.

4.10 Electrical Safety

Electricity may pose a hazard to Site personnel when portable electrical equipment is in use. If wiring or other electrical work is needed, a qualified electrician must perform it. See HS 119 in Attachment B for LO/TO procedures that may be appropriate for working around electric powered equipment.

General electrical safety requirements include the following:

- All electrical wiring and equipment must be of a type listed by Underwriters Laboratory (UL), Factory Mutual Engineering Corporation (FM), or other recognized testing or listing agency.
- All installations must comply with the National Electrical Safety Code (NESC), the National Electrical Code (NEC), or USCG regulations.
- Portable and semiportable tools and equipment must be grounded by a multiconductor cord having an identified grounding conductor and a multicontact polarized plug-in receptacle. See also HS 503 (Powered Hand Tools) in Attachment B for additional power tool safety procedures.
- Tools protected by an approved system of double insulation, or its equivalent, need not be grounded. Double-insulated tools must be distinctly marked and listed by UL or FM.
- Live parts of wiring or equipment must be guarded to prevent people or objects from touching them.
- Electric wire or flexible cord passing through work areas must be covered or elevated to protect it from damage by foot traffic, vehicles, sharp corners, projections, or pinching.
- All circuits must be protected from overload.
- Temporary power lines, switchboxes, receptacle boxes, metal cabinets, and enclosures around equipment must be marked to indicate the maximum operating voltage.
- Plugs and receptacles must be kept out of water unless they are of an approved submersible construction.
- All extension cord outlets must be equipped with ground-fault circuit interrupters.

- Attachment plugs or other connectors must be equipped with a cord grip and be constructed to endure rough treatment.
- Extension cords or cables must be inspected prior to each use and replaced if worn or damaged. Cords and cables must not be fastened with staples, hung from nails, or suspended by bare wire.
- Flexible cords must be used only in continuous lengths without splice. The only exception to this is molded or vulcanized splice made by a qualified electrician.

4.11 Lifting Safety

Using proper lifting techniques may prevent back strain or injury. See also HS 401 (Manual Material Handling/Back Injury Protection) and HS 404 (Handling Drums and Large Containers) in Attachment B for additional materials handling and drum handling procedures. The fundamentals of proper lifting include the following:

- The size, shape, and weight of the object to be lifted must be considered. A mechanical lifting device or additional persons must be used to lift an object if it cannot be lifted safely alone.
- Hands and the object should be free of dirt or grease that could prevent a firm grip.
- Gloves must be worn, and the object must be inspected for metal slivers, jagged edges, burrs, or rough or slippery surfaces.
- Fingers must be kept away from points that could crush or pinch them, especially when putting an object down.
- Feet must be placed far enough apart for balance. The footing should be solid, and the intended pathway should be clear.
- The load should be kept as low as possible, close to the body with the knees bent.
- To lift the load, grip firmly and lift with the legs, keeping the back as straight as possible. A worker should not carry a load that he or she cannot see around or over.
- When putting an object down, the stance and position are identical to that for lifting; the legs are bent at the knees and the back is straight as the object is lowered.

4.12 Ladder Safety

When portable ladders are used for access to an upper landing surface, the following safety procedures will be adhered to:

- The ladder side rails will extend at least 3 feet above the upper landing surface to which the ladder is used to gain access.
- When the 3-foot extension is not possible because of the ladder's length, the ladder will be secured at its top to a rigid support that will not deflect, and a grasping device, such as a grabrail, will be provided to assist personnel with mounting and dismounting the ladder.

In no case will the extension be such that ladder deflection under a load would, by itself, cause the ladder to slip off its support. Fall protection measures are further described in HS 120 (Fall Protection Program) Attachment B.

- Ladders will be kept free of oil, grease, and other slipping hazards.
- Ladders will not be loaded beyond the maximum intended load for which they were built, nor beyond their manufacturer's rated capacity.
- Ladders will be used only for the purpose for which they were designed.
- Non-self-supporting ladders will be used at an angle such that the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder (the distance along the ladder between the foot and the top support).
- Wooden job-made ladders with spliced side rails will be used at an angle such that the horizontal distance is one-eighth the working length of the ladder.
- Fixed ladders will be used at a pitch no greater than 90 degrees from the horizontal, as measured to the back side of the ladder.
- Ladders will be used only on stable and level surfaces unless secured to prevent accidental displacement.
- Ladders will not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental displacement. Slip-resistant feet will not be used as a substitute for care in placing, lashing, or holding a ladder that is used upon slippery surfaces, including, but not limited to, flat metal or concrete surfaces that are constructed in such a way that there is no way to prevent them from becoming slippery.
- Ladders placed in any location where they can be displaced by workplace activities or traffic, such as in passageways, doorways, or driveways, will be secured to prevent accidental displacement, or a barricade will be used to keep the activities or traffic away from the ladder.
- The area around the top and bottom of ladders will be kept clear.
- The top of a non-self-supporting ladder will be placed with the two rails supported equally unless it is equipped with a single support attachment.
- Ladders will not be moved, shifted, or extended while occupied.
- Ladders will have nonconductive side rails if they are used where the person or the ladder could contact exposed energized electrical equipment.
- The top step of the ladder will not be used as a step, nor will any step above a step on a ladder that is labeled "not a step."
- Cross-bracing on the rear section of stepladders will not be used for climbing unless the ladders are designed and provided with steps for climbing on both front and rear sections.

- Ladders will be inspected for visible defects daily and after any occurrence that could affect their safe use.
- Portable ladders with structural defects, such as, but not limited to, broken or missing rungs, cleats, or steps; broken or split rails; corroded components; or other faulty or defective components will either be immediately marked as defective or be tagged with "Do Not Use" or similar language, and the ladder will be withdrawn from service.
- Fixed ladders with structural defects, such as, but not limited to, broken or missing rungs, cleats, or steps; broken or split rails; or corroded components will be withdrawn from service.
- Ladder repairs will restore the ladder to a condition meeting its original design criteria before the ladder is returned to use.
- Single-rail ladders will not be used.
- When ascending or descending a ladder, the user will face the ladder.
- Personnel will use at least one hand to grasp the ladder when progressing up or down the ladder.
- Personnel will not climb any ladder while carrying items with their hands.

4.13 Scaffolding Safety

The "Safety Standards for Scaffold Used in the Construction Industry" as found in 29 CFR 1926, Subpart L, defines a scaffold as any temporary elevated platform (supported or suspended) and its supporting structure (including points of anchorage) used for supporting personnel or materials or both. A system scaffold is a scaffold consisting of posts of fixed connection points that accept runners, bearers, and diagonals that can be interconnected at predetermined levels.

Scaffolds will be designed by a qualified and competent person defined in 29 CFR 1926.450 and .451 and will be constructed and loaded in accordance with that design (i.e., capable of supporting, without failure, its own weight and at least four times the maximum intended load applied or transmitted). All scaffolds will be erected and used in compliance with applicable sections of 29 CFR 1926.450-.454 (scaffolds), .502 (personal fall arrest systems), and .1050-1060 (ladders) as well as all other applicable local, state, and federal codes and regulations pertaining to the safe design, construction, use, and dismantling of scaffolds. Fall protection measures are further described in HS 120 Attachment B.

4.14 Crane Safety

The OSHA standard defines a crane as "power-operated equipment that, when used in construction, can hoist, lower and horizontally move a suspended load."

- Cranes include mobile cranes, crawler cranes, tower cranes, boom trucks, articulating boom cranes, floating cranes, cranes on barges, overhead and gantry cranes, and locomotive cranes.

- The rule applies to cranes when used with attachments, such as hooks, magnets, grapples, clamshell buckets, concrete buckets, and draglines.
- Other lifting devices, including excavators, backhoes, aerial lifts, tow trucks, and forklifts, are not included under the crane standard, but are covered by other standards.

Crane-operator and rigger-training certificates and licenses for the previous three years through current compliance will be kept in the project file.

Cranes and their operators will comply with applicable sections of OSHA 29 CFR 1926.550, .552, .1400, and .1427 and the National Commission for the Certification of Crane Operators. Depending on the work and the crane lift rating, additional procedures such as Critical Lift Plans and Rigging Procedures may be required in addition to this OU-1/OU-2 RD/RA HASP.

4.15 Hot Work Safety Procedure

The purpose of the hot work safety procedure is to protect all personnel from hazards associated with activities producing sparks, flames, or other ignition sources and to prevent the loss of property due to fire. To effectively comply with the provisions of the OSHA standards governing fire prevention and hot work activities, the hot work safety procedure establishes practices to ensure that physical and chemical fire hazards present in the workplace are isolated from hot work activities. The hot work safety procedure is applicable to all welding, cutting, burning, grinding, and other spark-producing work activities. Additional details on implementing the hot work safety procedure, including a template for a hot work permit, are included in HS 511 Welding, Cutting, and Other Hot Work (Attachment B).

4.16 Confined Space Entry

A confined space is defined as a space large enough and so configured that a person can bodily enter and perform assigned work, has limited means for entry or exit, and is not designed for continuous employee occupancy. Potentially contaminated confined spaces may pose additional hazards such as air contamination, flammable or explosive atmosphere, and oxygen deficiency. Confined space entry may pose the possibility of engulfment. Personnel must be properly trained to supervise and participate in confined space entry procedures or serve as standby attendants.

Personnel conducting confined space entry activities or conducting activities near confined spaces which may create a hazard must meet the regulatory requirements outlined in 29 CFR 1910.146: Permit-Required Confined Spaces. Each contractor will provide qualified/competent and trained personnel as defined in 29 CFR 1910.146, who are responsible and have authority over confined space entry activities. The following sections include potential hazards and safety procedures associated with confined space and confined space-related activities. A confined space entry procedure is included as HS 118 in Attachment B. Any activity requiring confined space entry will develop an activity specific JSA based on this section of the HASP and the attached HS 118 and will meet the requirements in 29 CFR 1910.146. Requirements and procedures for working in confined spaces are discussed below.

4.16.1 Confined Space Identification and Designation

The SSO is responsible for identifying confined spaces into which personnel will enter. All confined spaces will be initially considered permit-required. Confined space entry is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

4.16.2 Duties of Personnel

Each confined space being entered will have at least one dedicated attendant (who will not have other duties) and one other support person (who may have other duties) within sight or call.

Duties of Entrants

- Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space.
- Alert the attendant whenever
  - the entrant recognizes warning signs or symptoms of exposure to a dangerous situation, or
  - the entrant detects a prohibited condition.
- Exit from the permit-required confined space (permit space) as quickly as possible whenever
  - an order to evacuate is given by the attendant or the entry supervisor,
  - the entrant recognizes warning signs or symptoms of exposure to a dangerous situation,
  - the entrant detects a prohibited condition, or
  - an evacuation alarm is activated.

Duties of Attendants

- Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- Be aware of possible behavioral effects of hazard exposure in authorized entrants.
- Maintain an accurate count of authorized entrants in the permit space. Accurately identify who is in the permit space by tagging the lifelines with the entrant's name and recording the names of the entrants. Remain outside the permit space during entry operations until relieved by another attendant.
- Communicate with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space.

- Monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space and order the authorized entrants to evacuate the permit space immediately under any of the following conditions:
  - The attendant detects a prohibited condition.
  - The attendant detects the behavioral effects of hazard exposure in an authorized entrant.
  - The attendant detects a situation outside the space that could endanger the authorized entrants.
  - The attendant cannot effectively and safely perform all his duties.
- Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards.
- Take the following actions when unauthorized persons approach or enter a permit space while entry is underway:
  - Warn the unauthorized persons that they must stay away from the permit space.
  - Advise the unauthorized persons that they must exit immediately if they have entered the permit space.
  - Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space.
- Perform non-entry rescues.
- Perform no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

Duties of Entry Supervisors

- Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- Verify, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin.
- Terminate the entry and cancel the permit as required.
- Remove unauthorized individuals who enter or who attempt to enter the permit space during entry operations.
- Determine that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.
- Document on the entry permit incidents or circumstances requiring review of the confined space entry program, which include the following:

- Unauthorized entry
- The detection of a condition/hazard not authorized by the permit
- The occurrence of an injury or near miss during entry
- A change in use or configuration of the space
- Personnel complaints about the program

- Prescribe procedures for coordinating entry when personnel from multiple employers will work simultaneously.

4.16.3 Procedures for Permit Space Entry

Procedures for inspecting, monitoring, and testing the confined space to verify that acceptable conditions exist prior to and throughout the entry operation are described in this section.

The acceptable entry conditions for entry into each space are outlined in the Permit-Required Confined Space Entry Permit (HS 118, Attachment B) and should be revisited along with the JSA for each confined space entry occurrence. The confined space must be isolated to prevent contaminants from being introduced during entry. Isolation must include disconnecting or installing slip blanks into lines leading to the space. To prevent injury from physical hazards within the space, LO/TO, tryout, and return-to-service procedures must be implemented for potential sources of hazardous energy. When isolation is not practical or possible (as in sewer entry) entry conditions must be continuously monitored.

Atmospheric hazards must be eliminated or controlled to meet the requirements specified in the PRCS Entry Permit Form. If necessary, the space will be purged or made inert, then ventilated to the extent necessary to meet the criteria. Ventilation equipment may be needed to maintain these conditions. In addition, a MultiRAE instrument (or equivalent) with photoionization detector (PID), oxygen, lower explosive limit (LEL), CO, and hydrogen sulfide sensors will be available for testing each confined space. All equipment will be maintained, per manufacturer recommendations, to adequately monitor and assess all confined space entries. Permit requirements for confined spaces will be tested continuously to detect changes in atmospheric conditions. Priority for atmospheric hazard testing will be oxygen, combustible gases, and then toxic gases.

Provisions for continuous communication between entrants and attendants will consist of powered communication equipment (i.e., radio). Powered communication equipment with the appropriate NEC rating will be provided. If this is not practical or possible, portable air horns must be provided to all entrants and attendants. Horn signals will be developed and documented in the JSA.

PPE worn during confined space entry will be defined in the JSA and in the confined space entry forms (HS 118) and may include respirators, protective suits, boots, and gloves, as well as face, head, and foot protection, as well as a chest or parachute harness with approved lifelines at least 0.5 inches in diameter and 2,000 pounds test. (Note: Wristlets may be used only when a harness presents a greater hazard to the Site worker and wristlets are the safest, most-effective alternative).

All lifelines will be secured to a mechanical device or fixed point outside the confined space. Mechanical devices will be used for all vertical entry permit spaces greater than 5 feet deep.

In addition, lighting and electrical will be of the appropriate NEC rating. Rating should be Class I, Division I unless the space specifically meets other rating requirements. Protective barriers are to be used to protect entrants from external pedestrian, vehicle, or equipment hazards. Ladders will meet the requirements of 29 CFR 1926 Subpart X, Ladders. Lifelines must be attached to a mechanical device outside the space such that a rescue can begin as soon as the rescuer becomes aware that a rescue is necessary.

Before entry is authorized, the entry supervisor will complete and sign the entry permit according to the written confined space program and document that all pre-entry requirements have been met and that acceptable entry conditions exist. The completed permit will be posted at the primary entrance to the permit space.

Entry permits are valid for a maximum of one work shift and will be canceled by the entry supervisor when the shift ends, confined space operations are complete, or whenever a prohibited condition arises in or near the space. All confined spaces will be securely closed or barricaded whenever the entry permit is canceled. Each entry permit must be completely executed and include all required information.

The SSO or designee will arrange for rescue services. The rescue personnel must be offered an opportunity to inspect the space and practice a rescue if necessary. The means that will be used to summon rescue services must be clearly communicated and documented on the entry permit.

5. PERSONAL PROTECTIVE EQUIPMENT LEVELS OF PROTECTION

PPE is required to safeguard Site personnel from various hazards. Varying levels of protection may be required depending on the levels of COCs and the degree of physical hazard. This section presents the various levels of protection (as defined by OSHA 1910.120 Appendix B) and identifies the conditions of use for each level.

5.1 Level D and Modified Level D Protection

The minimum level of protection that is required of personnel is Level D, which is worn when OU-1/OU-2 conditions present minimal dermal exposure hazard and no inhalation hazard. Level D protection includes the following equipment:

- Work clothing as prescribed by weather.
- Chemical and/or cut resistant gloves if handling potentially contaminated materials (may be used in combination depending on the task [e.g., cutting Geoprobe® liners]).
- Steel or composite toe and shank work boots, meeting American National Standards Institute (ANSI) Z41.
- Latex/polyvinyl chloride (PVC) overboots or Tyvek® boot covers when contact with COC-impacted media is anticipated.
- Safety glasses, depending on the hazard, with side shields or goggles, meeting ANSI Z87.
- Face shield in addition to safety glasses or goggles when projectiles or splash hazards exist.
- Hard hat, meeting ANSI Z89, when falling object hazards are present.
- Hearing protection – if noise levels exceed 85 dBA (A-weighted decibels), then hearing protection with a USEPA noise reduction rating (NRR) of at least 20 dBA must be used).
- Tyvek® suit, sleeves, or other clothing (e.g., apron, polyethylene coated Tyvek® suits for handling liquids) when body contact with COC-impacted media is anticipated.
- PFD if working near or on water where the potential for drowning exists. Prior to each use, the PFD or work vest must be inspected for defects that may alter its strength or buoyancy. Defective units must be tagged “Do Not Use” and removed from service.

5.2 Level C Protection

Level C protection will be required when the airborne concentration of COCs reaches one-half of the OSHA PEL or ACGIH TLV (ACGIH 2003a, 2003b). The respiratory protection program is discussed further in Section 5.4. The following equipment will be used for Level C protection:

- Full-face, National Institute for Occupational Safety and Health (NIOSH)-approved air-purifying respirator (APR) with a combination cartridge (GME P-100, or equivalent).
- Tyvek® suit with ankles and cuffs taped to boots and gloves.
- Nitrile outer gloves worn over nitrile surgical gloves.
- Steel or composite toe and shank work boots, meeting ANSI Z41.
- Chemical-resistant boots latex/PVC or Tyvek® overboots over work boots.
- Hard hat, meeting ANSI Z89.
- Hearing protection (if noise levels exceed 85 dBA, then hearing protection with a USEPA NRR of at least 20 dBA must be used).
- PFD if working near or on water where the potential for drowning exists. Prior to each use, the PFD or work vest must be inspected for defects that may alter its strength or buoyancy. Defective units must be tagged "Do Not Use" and removed from service.

If Level C protection is needed, the need and the approach to work will be detailed in an applicable JSA and a CP will help plan and supervise the work. Section 5.5 below outlines the procedures involving respirators and provides a starting point for a more detailed plan to be developed with the involvement of a CP.

5.3 Level A and Level B Protection

Levels A or B protection are rarely, if ever, needed for work efforts anticipated under this OU-1/OU-2 RD/RA HASP. Both level A and B require the highest level of respiratory protection consisting of a positive pressure, full face-piece, self-contained breathing apparatus (SCBA) or positive pressure supplied air respirator with escape SCBA, approved by NIOSH. Level A protection requires a fully encapsulating chemical protective suit in addition to other protective garments (additional undergarments, gloves, and boots). Level B protection does not require a fully encapsulating suit but requires a high level of chemical protection including a Tyvek® suit, inner and outer gloves, and other protection as appropriate for the hazard.

If Level A or B protection is needed, the need and the approach to work will be detailed in an applicable JSA and a CP will help plan and supervise the work. Section 5.5.3 below outlines the procedures involving supplied air respirators and provides a starting point for a more detailed plan to be developed with the involvement of a CP.

5.4 Personal Protective Equipment Selection

PPE will be selected based on the potential for contact, local conditions, air monitoring data, and the judgment of supervising personnel and health and safety professionals. The PPE used will be chosen to be effective against the COCs present and will be documented in the task-specific JSA.

Specifically, the level of PPE selected will be based on air monitoring of the work environment and an assessment by the SSO of the potential for skin contact with COCs.

For most activities, Level D or Modified Level D PPE will be worn and will be protective of workers. In dusty areas or for work that involves the potential for a higher level of exposure (e.g., confined space entry) or if constituents other than PCBs are present (in areas influenced by sources other than OU-3), Level C or higher PPE protection may be selected. If Level C or higher protection is needed, the need and the specific requirements will be developed and documented as part of the JSA process.

5.5 Respiratory Protection Program

CP qualification is required if respiratory protection is needed (HS 132 Attachment B). The OU-1/OU-2 respiratory protection program will consist of the following elements (at a minimum):

- All personnel who may use respiratory protection will have an assigned respirator.
- All personnel who may use respiratory protection will have been fit tested and trained in the use of a full-face APR within the past 12 months.
- All personnel who may use respiratory protection must have been medically certified within the past year as being capable of wearing a respirator. Documentation of the medical certification must be provided to the SSO prior to commencing OU-1/OU-2 work.
- Only cleaned, maintained, NIOSH-approved respirators will be used.
- If respirators are used, the respirator cartridge is to be properly disposed of at the end of each work shift or when load-up or breakthrough occurs.
- Contact lenses are not to be worn when a respirator is worn.
- All personnel who may use respiratory protection cannot have a beard. Mustaches and sideburns are permitted, only if they do not touch the sealing surface of the respirator.
- Respirators will be inspected and negative-pressure tested prior to each use.
- After each use, the respirator will be wiped with a disinfectant cleansing wipe. When used, the respirator will be thoroughly cleaned at the end of the work shift. The respirator will be stored in a clean plastic bag, away from direct sunlight in a clean, dry location in a manner that will not distort the face piece.

Forms documenting the respiratory protection program are included in Attachment A.9. Attachment A.9a summarizes the personnel, respirator, and training applicable for the task. Attachment A.9b is a fit test form and instructions. Attachment A.9c is a SCBA check form.

5.5.1 Respirator Use Training

Each respirator wearer will be provided formal training prior to being required to use respiratory protective equipment. Personnel who have not had formal respirator training within the previous 12 months will take a refresher training prior to using respiratory protective equipment. Personnel, the type of respirator, training, and medical clearance will be documented on the form included in Attachment A.9a.

Training will normally be provided in two distinct steps: general and OU-1/OU-2-specific. The general training will include the following:

- The provisions of this procedure and OSHA 29 CFR 1910.134
- Personnel responsibilities within the respirator program
- Respirator selection criteria
- Respirator issue procedures
- Inspection of respirators
- Cleaning and maintenance
- Discussions of the types of jobs that personnel may perform that require respirators, the hazards for which respirators would be required, and the typical types of respirators

The OU-1/OU-2-specific training will include the following:

- Provisions of the task-specific hazard and the respiratory protection selection
- Specific use, care, maintenance, and storage procedures
- Opportunity to handle and use the required respiratory protective equipment in a safe environment
- Specific communication and emergency provisions

5.5.2 Air-Purifying Respirators

The following requirements will apply to all use of APRs:

- Only full-face, negative-pressure APRs are acceptable for use unless specific authorization is provided by a CP.
- It is critical that APRs have the appropriate cartridges attached for the COCs; otherwise, the respirator will not protect the wearer.
- When using APRs with chemical cartridges, if an odor is noted or if irritation results, exit the work area and replace the cartridges.
- When using APRs with particulate filters, replace the filters when breathing becomes difficult.
- Chemical cartridges will not be used after the manufacturer's expiration date.
- Chemical cartridges will be discarded per the requirements of the approved OU-1/OU-2-specific respiratory protection plan.
- Assigned protection factors for the various styles of APRs are as follows:
  - Half-face APR – 10
  - Full-face APR – 50

- Powered APR (hood or similar flow-through system) – 25
- Powered APR (full-face mask) – 100

5.5.2.1 Training and Fit Testing for APRs

During initial respirator training, users of APRs will be taught the following prior to the issuance of respirators:

- Cartridge selection criteria
- Respirator and cartridge limitations
- Respirator use procedures
- Cartridge change-out frequencies and indications

Personnel will also be fit tested at least annually to determine the manufacturer, model, and size of respirator that best fits. A fit-testing form and guidance for fit testing are included in Attachment A.9b. The fit testing will be accomplished using one of the three accepted qualitative fit-test methods (quantitative fit testing may be performed; however, accepted protection factors of respirators will be based solely on qualitative factors specified in the regulation):

- Irritant smoke
- Isoamyl acetate
- Bitrex™

Fit testing will be conducted only by a CP trained in fit-testing procedures using the Qualitative Respirator Fit Test form in accordance with the Accepted Fit-Test Procedures (Attachments A.9b).

5.5.2.2 Donning/Doffing of APRs

Respirators will provide adequate protection only if properly donned. The following are the donning procedures for most APRs:

- Position the respirator on the face; pull the adjustment straps to secure the respirator in the proper location. Do not over tighten.
- Perform a positive and negative pressure check:
  - Positive pressure check: Place the palm of your hand lightly over the exhalation valve cover. Lightly exhale. The respirator should lightly push away from the face, with no outward leakage noted between the face and face piece.
  - Negative pressure check: Place hands lightly over the cartridges (or end of the hose) to cover the air holes. Inhale and hold breath. The respirator should lightly collapse on the face, with no inward leakage noted between the face and face piece.

5.5.3 Supplied Air Respiratory Protection

Prior to personnel using respiratory protection, the SSO will discuss the project, scope of work, chemical, physical, and environmental hazards that require this type of protection with the Project Manager and staff. Personnel requiring respiratory protection will participate in training and hands-on exercises prior to wearing the apparatus at OU-1/OU-2 and/or during work activities.

The following requirements will apply to all use of supplied air respiratory protection:

- Assigned protection factors for the various styles of supplied air respirator systems are as follows:
  - Airline system w/full-face mask (demand mode) – 50
  - Airline system w/full-face mask (pressure demand mode) – 1,000
  - SCBA system w/full-face mask (demand mode) – 50
  - SCBA system w/full-face mask (pressure demand mode) – 10,000
- Airline respirators will not be used with more than 300 feet of airline hose from the respirator to the air source.
- Airline respirators and SCBAs will be used only with air that meets the minimum requirement for Grade D air or better, as specified by the Compressed Gas Association.
- A certificate confirming these requirements will accompany each shipment of Grade D air.

SCBAs will be used whenever Level A or B protection is required, whenever the SSO requires their use, or whenever the hazards of a situation cannot be assessed prior to entry. Exceptions based upon OU-1/OU-2 conditions may be granted where the SSO has approved an airline respirator with escape pack system.

The SSO is responsible to ensure that OU-1/OU-2 personnel using the equipment maintain each SCBA in a ready-for-use state at all times. This includes performing the monthly inspections and inspecting, sanitizing, and refilling or replacing the air tanks after each use. A form for monthly SCBA inspections is included in Attachment A.9c.

Monthly inspections will include checks on tightness of connections and the condition of the headbands, valves, and connecting tubes. Rubber parts are to be inspected for pliability and deterioration. The air tank must be fully charged, and the hydrostatic test certification must be up to date (within three years for a composite cylinder, five years for a steel cylinder). Regulator and warning devices must function properly. A record of inspection dates is to be maintained on the monthly SCBA Inspection Form (Attachment A.9c), which will be maintained on the SCBA or in its storage container. The inspection checklists are to be kept with the SCBA for reference. Any deficiency noted during inspection requires removing the SCBA from service until the condition is corrected. The SCBA and the storage case must be clearly marked or tagged "Out of Service."

5.6 Using Personal Protective Equipment

The PPE needed for each task will be documented on the form included with the JSA prepared for that activity (Attachment A.2). Depending on the level of protection selected, specific donning and doffing procedures may be required. The procedures presented in this section are mandatory if Modified Level D or Level C PPE is used. All personnel entering the work area must don the required PPE in accordance with the requirements of this OU-1/OU-2 RD/RA HASP. When leaving the work area, personnel will remove the PPE in accordance with the doffing procedures to minimize the spread of COCs.

5.6.1 Donning Procedures

These procedures will be used for Modified Level D or Level C protection:

- Remove bulky outerwear.
- Remove street clothes and store in clean location.
- Put on work clothes or coveralls.
- Put on the required chemical-protective coveralls.
- Put on the required chemical-protective boots or boot covers.
- Tape the legs of the coveralls to the boots with duct tape.
- Put on the required chemical-protective gloves.
- Tape the wrists of the protective coveralls to the gloves.
- Don the required respirator and perform appropriate fit check (Level C).
- Put hood or head covering over head and respirator straps, and tape hood to face piece (Level C).
- Don remaining PPE, such as safety glasses or goggles and hard hat.

When wearing PPE, the buddy system should be used to check that each person has the proper PPE.

5.6.2 Doffing Procedures

The following procedures will be used for Modified Level D or Level C protection. When a person leaves the work area, the following decontamination sequence will be followed:

- When leaving the work area, rinse contaminated materials from the boots or remove contaminated boot covers.
- Clean reusable PPE.
- Remove outer gloves, Tyvek® coverall, and respirator (Level C). Remove inner gloves last, after all potential of handling of contaminated articles is completed. Disposable PPE should be placed in plastic bags that are labeled with contaminated-waste labels.

- Wash hands, face, and neck (or shower).
- Proceed to clean area and dress in clean clothing.
- Clean and disinfect respirator (Level C) for next use.

All disposable equipment, garments, and PPE must be bagged in plastic bags labeled for disposal. See Section 8.4 for detailed information on decontamination stations.

6. AIR MONITORING

Air monitoring for volatile organic compounds (VOCs) using a PID will be conducted in areas where the presence or absence of VOCs is not already understood or if there is the potential for high variability in VOC concentrations. If entering a confined space, a MultiRAE instrument (or equivalent) with PID, oxygen, LEL, CO, and hydrogen sulfide sensors will be used. Once initiated, monitoring will occur at least hourly and more frequently if action levels are exceeded. Air monitoring for particulates using a MIE dataRAM particulate monitor or the equivalent may be conducted if dust is a concern. If air monitoring is conducted, the SSO will be responsible for monitoring for dust and will adjust work practices according to Table 6-1. See Section 5 and document changes in PPE levels in the task-specific JSA. Monitoring data, if acquired, will be recorded on the Real-Time Air Monitoring Log (Attachment A.10).

6.1 Monitoring Equipment Maintenance and Calibration

All direct-reading instrumentation calibrations will be conducted under the approximate environmental conditions under which the instrument will be used. Instruments must be calibrated before and after use, and the readings and any necessary adjustments noted. All air monitoring equipment calibrations, including the standard used for calibration, must be documented on a calibration log or in the field notebook. Completed documentation/forms will be reviewed and maintained by the SSO.

All air-monitoring equipment will be maintained and calibrated in accordance with the specific manufacturer's procedures. Preventive maintenance and repairs will be conducted in accordance with the respective manufacturer's procedures. When applicable, only manufacturer-trained and/or authorized personnel will be allowed to perform instrument repairs or preventive maintenance.

If an instrument is found to be inoperative or suspected of giving erroneous readings, the SSO must be responsible for immediately removing the instrument from service and obtaining a replacement unit. If the instrument is essential for safe operation during a specific activity, that activity must cease until an appropriate replacement unit is obtained. The SSO will be responsible for confirming that a replacement unit is obtained and/or repairs are initiated on the defective equipment.

6.2 Air Action Levels

Table 6-1 (below) presents action levels for air that will be used to determine the procedures and protective equipment necessary based on conditions as measured at OU-1/OU-2.

Table 6-1. Action Levels for Air

Parameter	Reading	Action
Airborne Particulates[1]	0 to < 1.5 mg/m^3	Normal operations; continue hourly breathing zone monitoring
	> 1.5 mg/m^3 to 2.5 mg/m^3	Initiate dust suppression measures; if suppression measures are insufficient to reduce particulates below 2.5 mg/m^3 upgrade to Level C and increase monitoring frequency to every 15 minutes
	> 2.5 mg/m^3	Stop work, and notify the SSO
Volatile Organics	0 ppm to 5 ppm	Normal operations with hourly monitoring, if getting consistent readings, try to identify the source. Consider adjusting the action levels depending on possible source materials.
	5 ppm to 20 ppm	Investigate cause of readings to determine source; increase monitoring frequency to every 15 minutes
	> 20 ppm	Stop work, and contact SSO
Hydrogen Sulfide[2]	0 ppm to < 5 ppm	Normal operations
	> 5 ppm	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area
Oxygen[3]	< 19.5%	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area
	> 19.5% to < 23.5%	Normal operations
	> 23.5%	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area
Flammable Vapors (LEL)[4]	< 10% LEL	Normal operations
	> 10% LEL	Stop work, ventilate area, investigate source of vapors
Carbon Monoxide[5]	0 ppm to < 20 ppm	Normal operations
	> 20 ppm	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area

[1] The OSHA PEL is 15 mg/m^3 total dust and 5 mg/m^3 respirable dust. Particulate action levels for dust are also protective for the exposure to PCBs in air (PEL [Aroclor 1254] = 0.5 mg PCBs/m^3).
https://www.osha.gov/dsg/annotated-pels/tablez-1.html#notes

mg/m^3: milligrams per cubic meter

ppm: parts per million

[2] OSHA acceptable ceiling = 20 ppm. https://www.osha.gov/dsg/annotated-pels/tablez-2.html#notes

[3] https://www.osha.gov/laws-regs/regulations/standardnumber/1926/1926.1202

[4] https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=9797&p_table=STANDARDS

[5] OSHA PEL =50 ppm (8-hour TWA) and a peak CO level during cargo loading and unloading is 200ppm (https://www.osha.gov/OshDoc/data_General_Facts/carbonmonoxide-factsheet.pdf).

If action levels are approached or exceeded, actions will include attempting to mitigate the concentration(s) in air by modifying the work. If the concentrations in air cannot be reduced by changing work practices, personnel must use PPE (respirators; Section 5.5) to work in the area.

6.3 Training

Personnel who are assigned to conduct initial or periodic air monitoring tasks will be trained and qualified to conduct those tasks. Training information will include, but will not be limited to, the following:

- Instrument inspection
- Calibration frequency/protocol
- Sampling procedures
- Instrument limitation(s) (e.g., humidity, interferences)
- Maintenance
- Storage
- Shipping instrument(s) back to the vendor

6.4 Equipment Calibration

- All field portable monitoring instruments will be calibrated according to the manufacturer's instructions.
- If a project is of longer duration and/or visited periodically throughout the year, the personnel responsible for air monitoring need to ensure the instrument is serviced annually for maintenance, inspection, changing of sensors, etc.
- A record of calibration results will be documented in the field book or on an appropriate form.
- Records of all on-site calibration activities will remain with project files.

7. NOISE MONITORING

Noise monitoring may be conducted using a rated sound level meter as required. Hearing protection is mandatory for all personnel in areas with noise hazards, such as around heavy equipment. Generally, sound levels that cause speech interference at normal conversation distance require the use of hearing protection. Table 7-1 summarizes the PEL (duration) for given sound levels. The project action limits are set to one half of the PEL. Action levels define the maximum length of time that individuals may be exposed to noise levels without additional protection.

Table 7-1. Noise Exposure Levels

Sound Level (dBA)	Permissible Exposure Level (hours)	Action Level (duration of exposure) (hours)
80	NA	12
85	NA	8
90	8	4
95	4	2
100	2	1
105	1	0.5
110	0.5	0.25
115	0.25	0.1

NA: not applicable, OSHA does not provide a PEL for this sound level
https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.95

Exposure to noise will be managed through training, personnel awareness, and audiometric testing.

- Noise will be monitored in all areas where a potential noise hazard exists.
- A noise survey will be conducted when a change in equipment, procedures, or personnel may increase personnel exposure to noise.
- Personnel will be informed of noise monitoring results when full-shift noise exposure is at or above the action level.
- Areas and tasks where personnel exposure may be at or above the action level will be identified in the JSA and in daily safety meetings.
- Personnel will be notified of hearing protection requirements.
- Warning signs will be placed in areas where sound levels may require using hearing protectors.
- Hearing protection devices will be available for use by personnel.
- Personnel who may be exposed to loud noise will be trained in using hearing protection and will participate in an audiometric monitoring program, as required by OSHA.

- The SSO or Field Operations Lead will maintain an awareness of the noise levels in work areas for which they are responsible, personnel will be required to wear hearing protection in designated areas.
- A form for recording the type of instrumentation, readings for noise, hearing protection equipment, and record keeping is included in Attachment A.11 (Site-Specific Hearing Conservation Program for the Anniston PCB Site).

7.1 Hearing Protectors

Selection of appropriate hearing protectors must be based on actual or anticipated exposure levels. At a minimum, hearing protectors must provide a level of protection that brings actual or anticipated exposure below the PEL established for the time period shown in the table above. Additional information relative to hearing protector use is as follows:

- Hearing protection will be mandatory for all personnel exposed above a sound level (dBA) and duration in excess of the permissible exposure levels listed in Table 7-1.
- Hearing protection will be mandatory for all personnel working in any area that has not been evaluated for noise exposure and the ambient noise level in the area is such that voices must be raised to have a normal conversation with someone less than five feet away.
- Hearing protection will be mandatory for all personnel exposed to 85 dBA for 8 hours and 80 dBA for 12 hours.
- Hearing protection will be mandatory for all personnel who work on or near heavy equipment unless personal dosimetry or other techniques have been used to document actual exposure.
- Hearing protection will be mandatory for all personnel exposed to 85 dBA for any period of time and who have experienced a Standard Threshold Shift, as identified in an audiogram review.
- The SSO will approve all hearing protection. All personnel will be trained in the proper use, care, and maintenance of the protectors.

7.2 Training Requirements for Exposure to Noise

Hearing protection training will be conducted annually for all affected personnel. The training program will include a discussion of the following:

- The effects of noise on hearing, recognizing hazardous noise and symptoms of overexposure to hazardous noise
- When and where hearing protectors are required to be worn
- The purpose of hearing protectors
- The advantages, disadvantages, and effectiveness of various types of protectors

- Instructions on how to select, use, fit, and care for hearing protectors
- The purpose of audiometric testing, including an explanation of the test procedures

8. WORK ZONES AND DECONTAMINATION

This section describes the different zones that will be used to protect workers and prevent accidental spread of contamination outside of work areas.

8.1 Authorization to Enter

Only personnel with the appropriate training and medical certifications will be allowed to work at the project Site. The SSO will maintain a list of authorized persons; only personnel on the authorized-persons list will be allowed to enter the OU-1/OU-2 work areas.

8.2 Site Orientation and Hazard Briefing

No person will be allowed in the work area during OU-1/OU-2 operations without first being given a OU-1/OU-2 orientation and hazard briefing. This orientation will consist of a review of this OU-1/OU-2 RD/RA HASP or the applicable subcontractor OU-1/OU-2 RD/RA HASP and associated JSA(s). This review must cover the chemical, physical, and biological hazards; protective equipment; safe work procedures; and emergency procedures for OU-1/OU-2. Following this initial meeting, safety meetings will be held each day before work begins.

All people entering OU-1/OU-2 work areas, including visitors, must document their attendance at the orientation and hazard briefing, as well as at the daily safety meetings.

8.3 Certification Documents

Training and medical records for all Site personnel will be kept on-site during all OU-1/OU-2 operations. Records of completion of specialty training, such as first aid/CPR, as well as current medical clearances, will be maintained in the files. Training and medical documentation will be provided to the SSO prior to starting work.

8.3.1 Entry Requirements

In addition to the authorization, hazard briefing, and certification requirements listed above, no person will be allowed in any OU-1/OU-2 work area unless they are wearing the minimum PPE as described in the appropriate JSA. Note that Site visitors or observers who will not handle Site materials or who will maintain a distance from the hazard may not need the same level of PPE as those who are handling Site materials.

8.3.2 Emergency Entry and Exit

In the event of an emergency, work activities will cease. Personnel who are capable may address the emergency or may need to evacuate the area and call for help. If emergency personnel are called to enter the work area, they will be briefed of the hazards. People exiting the work area because of an emergency will gather in a safe area for a head count. The SSO or Field Operations Lead is responsible for confirming that all people who entered the work area have exited in the event of an emergency.

8.4 Contamination-Control Zones

Contamination-control zones are used to prevent the spread of contamination and to prevent unauthorized people from entering hazardous areas. Work areas will be delineated as an exclusion zone (EZ), contamination-reduction zone (CRZ), or support zone (SZ) prior to beginning operations.

8.4.1 Exclusion Zone

The EZ is the defined area where there is a possible respiratory and/or contact health hazard. An EZ may consist of a specific work area or may be the entire area of potential contamination. All personnel entering an EZ must use the required PPE and must have the appropriate training and medical clearance for hazardous waste work. Depending on the location of the work, the proximity of potential bystanders and the accessibility of the area, it may be helpful to use cones, caution tape, fencing, or other barricades to identify the location of the EZ and to prevent inappropriate or unauthorized access.

8.4.2 Contamination-Reduction Zone

The CRZ or transition area will be established, if necessary, to perform decontamination of personnel and equipment. Personnel entering or leaving the EZ will pass through this area to prevent contamination from leaving the EZ. Tools, equipment, and machinery will be decontaminated in a specific location. Personnel leaving the work area will be decontaminated adjacent to the EZ. Personal protective outer garments and respiratory protection will be removed in the CRZ and prepared for cleaning or disposal. This zone is the only appropriate corridor between the EZ and the SZ.

8.4.3 Support Zone

The SZ is a clean area outside the CRZ located to prevent personnel exposure to hazardous substances. Eating and drinking will be permitted in the SZ only after proper decontamination and/or removal of PPE (e.g., gloves). Smoking may also be permitted in the SZ, subject to OU-1/OU-2 requirements.

8.4.4 Contamination Zone Posting

If needed to inform and protect nearby workers, the public or bystanders, work areas may be marked and delineated using cones, caution tape, or fencing.

8.5 OU-1/OU-2 Inspections

The SSO will conduct inspections of activities, equipment, and procedures to verify that the required elements are in place. The Health and Safety Inspection Form in Attachment A.12 may be used as a guide for daily inspections.

8.6 Decontamination

All personnel will review the operating procedures and PPE prior to decontamination. Personnel involved in decontamination activities must wear PPE that is appropriate for the task (generally

Level D) and no more than one level below the level worn by personnel working in the EZ. Only persons trained in the use and maintenance of a pressure washer may use such equipment. Decontamination procedures are described below.

8.6.1 Personnel Decontamination

All personnel wearing Modified Level D or Level C protective equipment in the EZ must undergo personal decontamination prior to entering the SZ. The following materials will be available for decontamination as needed: galvanized wash tub, tap water, plastic sheeting, alkaline soap solution (Alconox® or other heavy-duty detergent), long-handled scrub brushes, disposable plastic to cover the station area, disinfectant wipes to clean the inside of a respirator, and distilled water in a squeeze bottle for rinsing. The personnel decontamination area will consist of the following stations, at a minimum:

- **Station 1**: Personnel leaving the contaminated zone will remove the gross contamination from their outer clothing and boots.
- **Station 2**: Personnel will remove their outer garments and gloves and dispose of them in properly labeled containers. Personnel will then decontaminate their hard hats and boots with an aqueous solution of detergent or other appropriate cleaning solution. These items will then be hand-carried to the next station.
- **Station 3**: Personnel will thoroughly wash their hands and face before leaving the CRZ. Respirators will be sanitized and then placed in a clean plastic bag.

8.6.2 Equipment Decontamination

A decontamination pad on a suitable surface (concrete or paved area) with polyethylene sheeting or other appropriate containment system will be established, if needed. All vehicles that have entered the EZ will be decontaminated at the decontamination pad prior to leaving the zone. If the level of vehicle contamination is low, decontamination may be limited to rinsing tires and wheel wells with water. If the vehicle is significantly contaminated, steam cleaning or pressure washing of the vehicle and equipment may be required.

Personnel involved in decontamination activities may be dermally exposed to contaminated materials and chemicals brought to OU-1/OU-2 as part of the project work. Personnel involved in decontamination including pressure washing activities may also be exposed to emissions from heavily soiled equipment, high-pressure water spray, and noise.

Pressure washing is the process of using a stream of water at high pressure to clean or prepare surfaces by removing foreign matter and contaminants. The hazards of high-pressure water cleaning are related to the high pressure of the water, which may exceed 10,000 pounds per square inch (psi) at the nozzle.

Contact with the water spray may cause severe lacerations, which may then be contaminated with hazardous material. Because of the high pressure involved, the water stream could slice or be injected through soft tissues of the body. Pressure washers will also cut through bone at high enough pressures. A second hazard is repetitive motion, or cumulative trauma disorder. These

serious disorders are related to repeatedly squeezing the trigger or constantly fighting the pressure of the spray gun with the forearm or wrist. When pressure washing or steaming, the health and safety precautions outlined below must be observed.

Pressure washing presents a splash hazard. Protection against splashes to face and skin is mandatory. The pressure washer is never to be pointed at a person. Steam cleaning presents a thermal burn hazard in addition to the hazards presented by pressure washing. Adequate protection from the hot surfaces must be provided.

The following general requirements are provided for high-pressure water cleaning activities:

- The gun, pressure piping, pressure hose ends, and couplings will have a burst pressure of at least four times the operating pressure.
- No equipment or component of such equipment will be operated beyond the manufacturer's specifications or beyond the rated working pressure.
- The maximum operating pressure will be permanently displayed on the pumping unit.
- Safety glasses, face shield, hearing protection, and safety shoes will be worn during operation.
- Hands should be alternated frequently during long periods of use.
- Operators should be rotated periodically.
- A washer with a gun that supplies water to the wand in a straight line as opposed to supplying water through the grip will be used. This eliminates the gun's twisting motion.
- The equipment will be maintained in good condition.
- Releasing the trigger must stop the flow of water. The trigger must not be tied back to keep it in an “on” position.
- A hose safety shroud will be placed on hoses whenever operating pressure exceeds 2,000 psi.
- The pressure control will be a "deadman" type to safely reduce the nozzle discharge pressure when control is released.
- The pressure discharge gauge indicating pump pressure will be clearly visible for monitoring pump pressure.
- A pressure relief device set to relieve at 110% of the maximum working pressure of the unit or its components, whichever is lower, will be installed on the pump. The relief will be clearly marked and displayed on the device.
- A strainer or filter should be installed on the water supply system to prevent debris from entering the water blasting units and clogging the gun, control, or other device.
- If a water line breaks, it may whip about; therefore, relieve the pressure before trying to grab the line.

The decontamination facility will be inspected daily for evidence of leaks or loss of integrity to the containment system. If any deficiencies are noted, they will be corrected immediately. Wastewater and waste materials generated during activities will be contained in the decontamination system for characterization and proper treatment and/or disposal.

8.6.3 Personal Protective Equipment Decontamination

Where and whenever possible, single-use, external protective clothing will be used for work within the EZ or CRZ. This protective clothing will be disposed of in properly labeled containers. Reusable protective clothing will be cleaned with detergent and water. The rinsate will be collected for treatment and/or disposal.

When removed from the CRZ, respirators will be thoroughly cleaned with soap and water. The respirator face piece, straps, valves, and covers must be thoroughly cleaned at the end of each work shift and ready for use prior to the next shift. Respirator parts may be disinfected with a solution of bleach and water or by using a spray disinfectant.

9. TRAINING AND MEDICAL SURVEILLANCE

9.1 Training

All project personnel who work in areas where they may be exposed to COCs must be trained as required by OSHA Regulation 29 CFR 1910.120 (HAZWOPER). Field personnel also must receive a minimum of 3 days of actual field experience under the direct supervision of a trained, experienced supervisor. Managers and supervisors will receive an additional 8 hours of training. Personnel who completed their initial training more than 12 months prior to the start of the project must have completed an 8-hour refresher course within the past 12 months. The SSO must have completed an additional 8 hours of supervisory training and must have current first aid and CPR certificates.

OU-1/OU-2-specific training will be accomplished by having personnel read this OU-1/OU-2 RD/RA HASP or an applicable contractor HASP and attend a briefing on the risks and mitigating measures. The review will include a discussion of the chemical, physical, and biological hazards; protective equipment and safety procedures; and emergency procedures.

9.2 First Aid and CPR

At least one Site worker with current training in first aid and CPR will be assigned to the work crew and will be present during field operations. Refresher training in first aid and CPR is required to keep the certificate current. These individuals must also receive training regarding the precautions and protective equipment necessary to protect against exposure to blood-borne pathogens.

9.3 Blood-Borne Pathogens

The accidental transmission of infectious agents to persons handling infectious materials in the workplace led OSHA to adopt the 29 CFR 1910.1030 regulation to protect healthcare workers. These regulations now apply to all personnel who may encounter blood-borne pathogens. For the Anniston PCB Site, the potential for exposure is mostly associated with performing first aid or CPR.

Pathogenic microorganisms can be present in human blood and other body fluids and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV). Occupational exposure includes reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials while working at OU-1/OU-2. First aid and CPR providers should use all applicable universal precautions, engineering controls, approved work practices, and PPE when providing first aid and CPR. To reduce the potential for exposure incidents, personnel with minor injuries should be encouraged to apply first aid procedures to themselves when it can be done without compromising the quality of treatment. In addition, the following steps will be taken to minimize the potential for exposure to blood-borne pathogens:

- Examine and maintain engineering controls regularly to optimize their effectiveness. Changes in technology that eliminate or reduce exposure to blood-borne pathogens will be incorporated when identified. Resuscitation equipment and other ventilation equipment will be included in first aid kits to eliminate the need for direct mouth-to-mouth contact if CPR is performed.
- Do not eat, drink, smoke, handle contact lenses, or apply cosmetics in areas where exposure to blood-borne pathogens is possible.
- Wear gloves and use mouth shields whenever there is a possibility that bodily fluids could contact personnel.
- Perform procedures involving blood and other potentially infectious materials in such a manner that will minimize splashing or spraying.
- Wash hands as soon as possible after handling potentially infectious materials and after removing protective clothing and equipment.
- Use an appropriate antiseptic hand cleanser, in conjunction with clean paper towels or antiseptic towelettes in work areas where provision of hand washing facilities is not feasible. When antiseptic hand cleansers or towelettes are used, hands will be washed with soap and running water as soon as feasible.
- Remove all protective equipment when leaving the work area. If the equipment is contaminated, place it in a proper storage container for washing, decontamination, or disposal.
- Remove contaminated clothing before entering other areas of the building or leaving the building.

9.3.1 Medical Wastes

- Separate all medical/infectious waste from other waste at the point of origin, and place (except for sharp objects) in double, disposable red bags with “Biohazard” and “Infectious Waste” labels.
- Place all sharp items—needles, scalpels, razor blades, or broken glass—in puncture-proof, leak-proof, labeled or color-coded containers for proper disposal.
- Place all infectious waste in leakproof bins or barrels marked “Biohazard” and “Infectious Waste.” These will be collected by a licensed infectious-waste removal company.
- Disinfect contaminated reusable equipment before washing for reuse. Decontaminate reusable glassware in a 1:9 bleach solution before rinsing and acid washing, then sterilize the glassware in an autoclave. Decontaminate floors and other surfaces with a 1:9 bleach solution as well.

9.3.2 Notification Requirements and Follow-Up

First aid and CPR providers must notify the Project Manager and SSO immediately (that is, as soon as the emergency is under control) if involved in an exposure incident.

Exposed personnel should seek medical attention immediately. Medical testing and treatment may be required as soon as possible after exposure to maximize effectiveness.

9.3.3 Blood-Borne Pathogen Training

All personnel assigned to first aid/CPR service with occupational exposure to potentially infectious materials will receive specialized training prior to commencement of work. thereafter, covering the following elements:

- A copy of 29 CFR 1910.1030 and an explanation of its contents.
- A general explanation of the epidemiology and symptoms of blood-borne diseases.
- An explanation of the modes of transmission of blood-borne pathogens.
- An explanation of the appropriate methods for recognizing tasks and other activities that may involve exposure to blood and other potentially infectious materials.
- An explanation of the use and limitations of practices that will prevent or reduce exposure, including appropriate engineering controls, work practices, and PPE.
- Information about the types, proper use, location, removal, handling, decontamination and/or disposal of PPE.
- An explanation of the basis for PPE selection.
- Information on the HBV vaccine, including information on its efficacy, safety, and the benefits of being vaccinated.
- Information on the appropriate actions to take and persons to contact in an emergency.
- An explanation of the procedure to follow if an exposure incident occurs, including the method of reporting the incident and the medical follow-up that will be made available, as well as information on the medical counseling that is provided for exposed individuals
- An explanation of required signs and labels.

9.3.4 Training Records

Training records will include the date of training, the contents of the training, names of the instructor(s) and attendees.

9.4 Medical Surveillance

All personnel who are potentially exposed to COCs must participate in a medical surveillance program as defined by OSHA at 29 CFR 1910.120(f).

9.4.1 Preplacement Medical Examination

All personnel with the potential to be exposed to contamination must have completed a comprehensive medical examination prior to assignment and periodically thereafter as defined by

applicable regulations. The preplacement and periodic medical examinations typically include the following elements:

- Medical and occupational history questionnaire
- Physical examination
- Complete blood count, with differential
- Liver enzyme profile
- Chest X-ray, at a frequency determined by the physician
- Pulmonary function test
- Audiogram
- Electrocardiogram for persons older than 45 years of age or if indicated during the physical examination
- Drug and alcohol screening, as required by job assignment
- Visual acuity
- Follow-up examinations, at the discretion of the examining physician or the corporate medical director; the examining physician will provide the Site worker with a letter summarizing his or her findings and recommendations, confirming the worker's fitness for work and ability to wear a respirator; documentation of medical clearance will be available for each Site worker during all Site work.

Subcontractors will certify that all their personnel have successfully completed a physical examination by a qualified physician. The physical examinations must meet the requirements of 29 CFR 1910.120 and 29 CFR 1910.134. Subcontractors will supply copies of the medical examination certificate for each Site worker who will work on OU-1/OU-2.

9.4.2 Other Medical Examinations

In addition to preemployment, periodic, and exit physicals, personnel may be examined after known or suspected exposure to toxic or hazardous materials and at the discretion of the SSO or occupational physician.

9.4.3 Periodic Exam

Following the preplacement examination, personnel must undergo a periodic examination, similar in scope to the preplacement examination. For personnel potentially exposed more than 30 days per year above the applicable PELs, the frequency of periodic examinations will be 12 months. For Site workers potentially exposed less than 30 days per year above the applicable PELs, the frequency for periodic examinations will be 24 months.

9.5 Medical Restriction

When the examining physician identifies a need to restrict work activity, the Site worker's supervisor must communicate the restriction to the Site worker and the SSO. The terms of the restriction will be discussed with the Site worker and the supervisor.

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10. EMERGENCY PROCEDURES

Prior to the start of operations, the work area will be evaluated for the potential for fire, contaminant release, or other catastrophic event. Unusual conditions or events, activities, chemicals, and conditions will be reported to the SSO immediately.

The SSO will establish evacuation routes and assembly areas for each work area. All personnel entering work areas will be informed of these routes and assembly areas.

10.1 Emergency Response

This section presents the measures to prepare for an emergency and the procedures to follow in the event of an emergency, including follow-up activities. Task-specific emergency procedures will be presented in individual JSAs and in the OU-1/OU-2 RD/RA Emergency Response Plan (P/S 2021). Personnel must be knowledgeable of the procedures described in the JSAs and applicable procedures described herein. Emergency response procedures specific to each task will be included in each JSA. Site workers will use the JSA and Emergency Response Plan information for any activities related to responding to emergencies.

10.1.1 Emergency Response Procedures

In the event of any emergency, the SSO or designated alternate will be immediately notified via the Site communication system (i.e., cell phones and two-way radios). The task-specific JSAs provide emergency response procedures as well as general safety requirements, external emergency contacts and project-related contacts, and routes to medical care facilities for reference in the event of an emergency.

10.1.2 Emergency Contacts, Summoning Emergency Services

The emergency and nonemergency contacts (at the front of this document) include a list of contacts and telephone numbers for the applicable local emergency responders. Applicable contacts specific to each task are also provided in the task-specific JSAs.

In the event of a **serious emergency requiring emergency response from external emergency providers—**whether serious injury, fire, security incident, utility-related event, or other serious emergency—the following procedures will be implemented unless task-specific procedures are identified in the JSA:

1. Call 911 to summon police/fire department/ambulance.
2. Notify SSO immediately.
3. Call 911:
    a If a recording is reached, do not hang up, wait for the call-taker to respond.
    b Provide an accurate description of the event
    c Stay calm, listen carefully, follow all instructions
    d Answer all questions accurately and clearly

4. Conduct evacuation procedures as appropriate for the situation.
5. Provide accurate rendezvous location. This location will depend on the location of the work area. Direct responders to the nearest road or intersection and assign a Site worker to wait for and further direct emergency responders.
6. After incident is stabilized and emergency response procedures are complete, notify appropriate personnel.

In the event of a nonserious or non-life-threatening injury or event/incident:

1. Notify the SSO immediately.
2. Respond as appropriate for the incident (e.g., use fire extinguisher, administer first aid, seek nonemergency medical attention, stabilize the situation).

10.1.3 Evacuation

If applicable, the SSO will call for evacuation of the work area. If evacuation is required, workers should move to the meeting location (rally point) identified for the work area and included in the task-specific JSA. Three loud blasts on the emergency air horn will indicate evacuation is required.

10.1.4 Man Overboard (from Work Boat)

In the event of a man overboard situation, the following procedures will be followed:

- All boat personnel will be immediately made aware of the situation.
- One lookout will be assigned to constantly monitor and report the location of the person overboard.
- A ring buoy will be deployed to the overboard person. Movement of the boat at this time should be limited to as little as necessary.
- Ring buoy should be deployed whether the person overboard is conscious or unconscious as the device will serve to mark the location of the person.
- If the person can swim to or be pulled to the boat without moving the boat, then the boat should remain as stationary as possible.
- Moving the boat to the overboard person should be done cautiously. The operator of the boat and the lookout should be in constant communication.
- If available and appropriate, a ladder should be deployed for boarding the boat. The person should be allowed to enter the boat unassisted, if possible.
- If the person is unconscious, either pull him or her onboard using the shoulders of the life jacket or hold or secure the person to the side of the boat while the boat moves slowly to shallow water.
- Precautions should immediately be taken to avoid hypothermia. Dry clothes and blankets should be supplied to the person.
- The boat should move immediately to the nearest docking location and support personnel should be notified of the incident.

- All man overboard situations should be reported to the SSO.

10.1.5 Fire/Explosion

For small fires, flames should be extinguished using a fire extinguisher by trained personnel. In the event of large fires or explosions, the local fire department should be contacted; they will handle mitigation and control. Fire extinguishers are standard safety equipment and will be included routinely at each work area. A fire extinguisher will always be available on motor-driven marine vessels, work vehicles, and at work areas. The type of fire extinguisher provided must be adequate for the category of fire that is at risk to occur. The location of the fire extinguisher will be indicated during the preliminary health and safety orientation conducted at the start of a given task and reviewed when appropriate.

10.1.6 Monthly Fire Extinguisher Inspection

Fire extinguishers must be inspected monthly. An inspection record must be kept in the Site files. The inspection must verify the following:

- Hose, horn, and/or nozzle are unobstructed.
- Gauge pressure must be in the operable range.
- Lock pin and tamper seal must be in place.

10.1.7 Chemical Spill, Spill Containment

Tasks for this project may involve handling drums or containers that contain stored chemicals or wastes associated with sampling, invasive work, transportation, etc. Personnel must implement the hazard-mitigating procedures for drum/container handling presented in HS 404 (Handling Drums and Large Containers) in Attachment B. Review the SDS for any hazardous chemicals that will be used at OU-1/OU-2 and conduct spill mitigation measures and containment as required. Conduct air monitoring, if appropriate, using equipment and action levels discussed in Section 6 and in the JSA to determine needed level of PPE; don the required level of PPE and prepare to implement control procedures. Any additional spill mitigation measurements will be provided in task-specific JSAs.

10.1.8 Weather-Related Emergencies

The occurrence or coming of dangerous weather will result in the temporary suspension of work activities. Work will not resume until the dangerous weather has passed and the conditions are deemed safe. If lightning is seen or thunder is heard, stop work and seek shelter immediately. Wait 30 minutes after the last thunder heard and lightning seen before work is resumed. If Site workers are caught on the water during unforeseen inclement weather, they must immediately stop work and evacuate the work area via the egress points indicated in the task-specific JSA. Personnel will seek shelter in field vehicles until notified by the SSO that work may continue.

10.1.9 Security Emergencies

Tasks for this project involve working in environments that may require additional security. Site workers should avoid interaction with bystanders or other unauthorized people. Should a Site worker feel endangered by a bystander, the worker must stop work, move to a safe location, and call the local police or, if a life-threatening situation exists, call 911. The JSA for each work activity will consider the need for a larger field crew or a journey management plan, especially if working in remote areas. See Section 3.4 on the buddy system.

If an incident occurs, the SSO should take the following steps:

- Evaluate the incident and assess the need for assistance and/or evacuation.
- Call for outside assistance as needed.
- Confirm that the Project Manager (or Task Manager) is notified promptly of the incident.
- Take appropriate measures to stabilize the incident scene.

10.2 Medical Emergency

All injuries must be promptly reported to the SSO. The SSO is responsible for the following:

- Confirming that the injured person receives prompt first aid and medical attention.
- Seeing that the person is transported by appropriate means to the nearest urgent care facility (normally a hospital emergency room) if it is an emergency.
- Notifying the Project Manager (or Task Manager), and appropriate contacts as soon as possible after the injured person is safely evacuated.

10.3 Emergency Care Steps

Upon entering an accident area, Site workers must follow the emergency care steps listed below. The steps are to be performed by trained first aid/CPR providers.

- Survey the scene. Determine whether it is safe to proceed. Try to determine whether the conditions that caused the incident are still a threat. Protect yourself from exposure before attempting to rescue the person.
- Do a primary survey of the person. Check for airway obstruction, breathing, and pulse. Assess likely routes of chemical exposure by examining the eyes, mouth, nose, and skin of the person for symptoms.
- Phone emergency medical services (EMS). Give the location, telephone number used, caller's name, what happened, number of persons affected, the condition of the person(s), and what help is being given.
- Maintain airway and perform rescue breathing as necessary.
- Perform CPR as necessary.

- Do a secondary survey of the affected person(s). Check vital signs and do a head-to-toe exam.
- Treat other conditions as necessary. If the person(s) can be moved, take him or her to a location away from the work area where EMS can gain access.

10.4 First Aid – General

All persons must report any injury or illness to their immediate supervisor or the SSO. Trained personnel will provide first aid. Injuries and illnesses requiring medical treatment must be documented. The SSO must conduct an incident investigation as soon as emergency conditions no longer exist and first aid and/or medical treatment has been confirmed. Incident investigation reports must be completed and submitted to the Project Manager and P/S within 24 hours after the incident.

If first aid treatment is required, first aid kits are kept at the CRZ. If treatment beyond first aid is required, the injured person(s) should be transported to the medical facility. If the injured person is not ambulatory or shows any sign of not being in a comfortable and stable condition for transport, then an ambulance or paramedics should be summoned. If there is any doubt as to the injured person's condition, it is best to let the local paramedic or ambulance service examine and transport the person.

10.5 First Aid - Medical Emergencies

A first aid kit and portable eyewash equipment will be available anywhere where work is being performed so that personnel can easily and quickly administer first aid. The location of the first aid kit and portable eyewash equipment will be indicated during the preliminary health and safety orientation conducted at the start of a given task and reviewed when appropriate. All first aid kits supplies will be replenished after use as soon as possible and no later than 24 hours after use. The following measures will be followed if material gets into the eyes:

- Flush eyes with water for at least 15 minutes if chemicals do get into the eyes. If condition persists, seek medical attention.
- If dust or foreign objects are in the eyes, do not rub the eyes.
- If an object becomes embedded in the eye, do not attempt to remove. Lightly bandage the eye or both eyes, if possible, and immediately seek medical attention.

Two hospitals near the Site have been identified. Unless a different hospital or urgent care facility is indicated in a task-specific JSA, either the Northeast Alabama Regional Medical Center, located at 400 East 10th Street or St. Vincent's St. Clair Hospital, located at 7063 Veterans Pkwy in Pell City, Alabama, will be used. Locations of these hospitals are on Figure 2 and the figure attached to the JSA in Attachment A.2. Section 10.11 and the JSA also include the facilities names, phone numbers, and written directions from the west and south (for Northeast Alabama Regional Medical Center) and from the east (for St. Vincent's). The names and contact information for the medical facilities are provided on the emergency contact list included at the front of this OU-1/OU-2 RD/RA HASP.

In the event of a medical emergency requiring urgent emergency medical care, an ambulance service, if available, will be used to transport the injured person to the hospital.

In the event of noncritical, non-life-threatening injury requiring medical evaluation or treatment, use the closest walk-in urgent care facility

10.6 First Aid – Inhalation

Personnel complaining of symptoms of chemical overexposure will be removed from the work area and transported to the designated medical facility for examination and treatment.

10.7 First Aid – Ingestion

If ingestion of a contaminant is suspected or confirmed, call EMS and consult a poison control center for advice. If available, refer to the SDS for treatment information. If the person is unconscious, keep him or her on his or her side and clear the airway if vomiting occurs.

10.8 First Aid – Skin Contact

Personnel who have had skin contact with contaminants will, unless the contact is severe, proceed through the CRZ to the wash area. The person will remove any contaminated clothing and then flush the affected area with water for at least 15 minutes. The person should be transported to the medical facility if he or she shows any sign of skin reddening, irritation, or if he or she requests a medical examination.

10.9 First Aid – Eye Contact

Personnel who have had contaminants splashed in their eyes or who have experienced eye irritation while in the EZ must immediately proceed to the eyewash station in the CRZ. Do not decontaminate prior to using the eyewash. Remove whatever protective clothing is necessary to use the eyewash. Flush the eye with clean running water for at least 15 minutes. Arrange prompt transport to the designated medical facility.

10.10 Reporting Injuries, Illnesses, and Near Miss Incidents

Injuries and illnesses, however minor, will be reported to the SSO immediately. The SSO will complete the Incident/Near-Miss Investigation Report (Attachment A.5) and submit it to the SSO and the Project Manager and P/S within 24 hours. Near miss incidents are situations in which no injury or property damage occurred, but under slightly different circumstances an injury or property damage could have occurred. Near misses are caused by the same factors as injuries; therefore, they must be reported and investigated in the same manner.

10.11 Emergency Information

The means to summon local public response agencies, such as police, fire, and ambulance, will be reviewed in the daily safety meeting. These agencies are identified on the emergency contact list included at the front of this OU-1/OU-2 RD/RA HASP.

Directions to Regional Medical Center

A route to the Anniston Regional Medical Center is included on Figure 2. This figure and the following directions will also be included on each JSA unless the work location (as discussed in the JSA) finds that another medical facility is closer or more appropriate.

- **From the West**: Take Highway 202 East. Pass through the intersection with Quintard Avenue, Highway 202 becomes 9th Street. The Regional Medical Center is 1.5 blocks ahead on the left.
- **From the South**: Take Quintard Avenue North to 9th Street. Turn right on 9th Street. The Regional Medical Center is 1.5 blocks ahead on the left.

Direction to St. Vincent's St. Clair Hospital

A route to St. Vincent's St. Clair Hospital is included on Figure 2. This figure and the following directions will also be included on each JSA unless the work location (as discussed in the JSA) finds that another medical facility is closer or more appropriate.

- **From the East:** take I-20 W to exit 158, US -231 N/Martin St. N in Pell City. Take Hazelwood Dr and Veterans Pkwy to St. Vincent's St. Clair.

11. REFERENCES

ACGIH. 2003a. *Threshold Limit Values Handbook*. American Conference of Governmental Industrial Hygienists. Cincinnati, OH.

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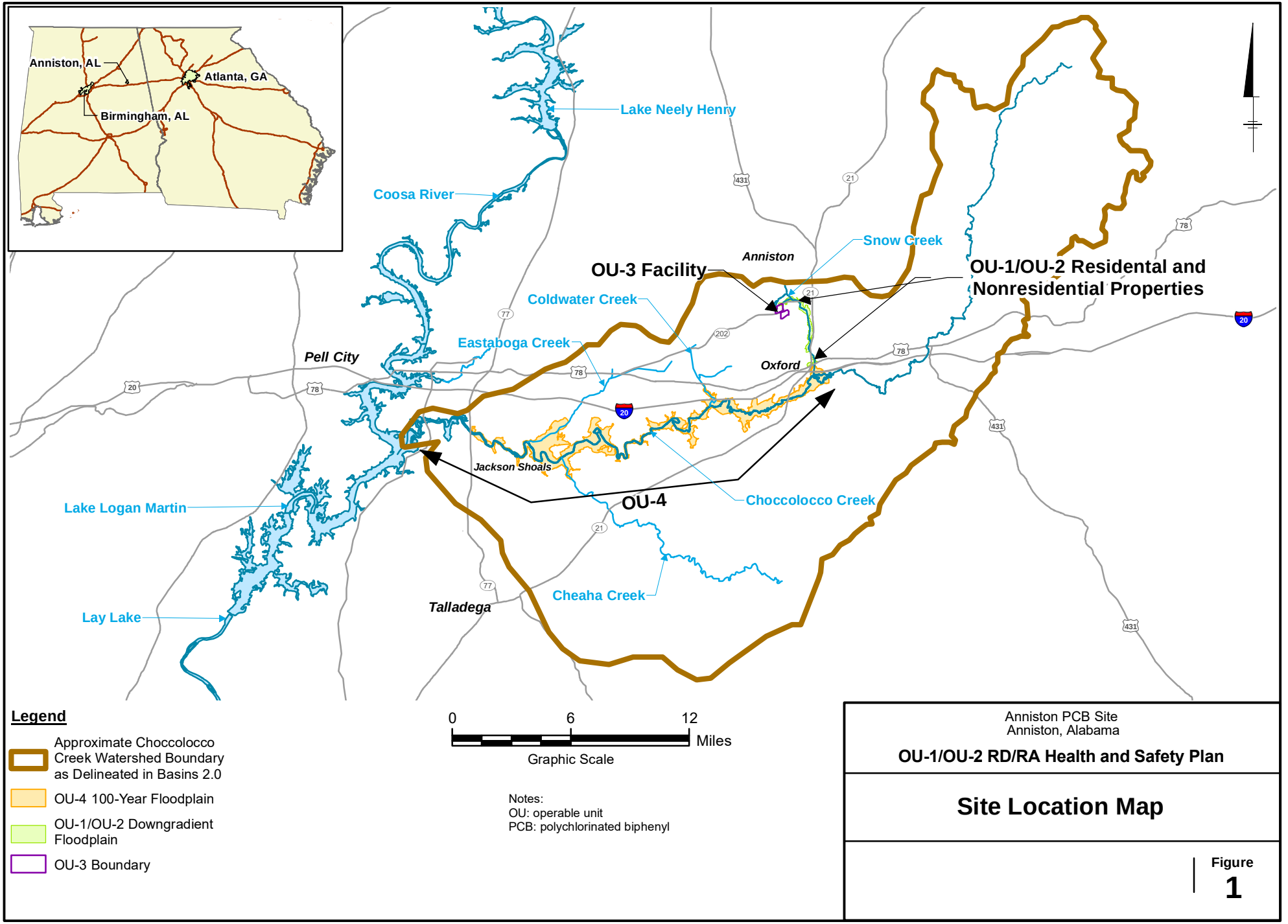
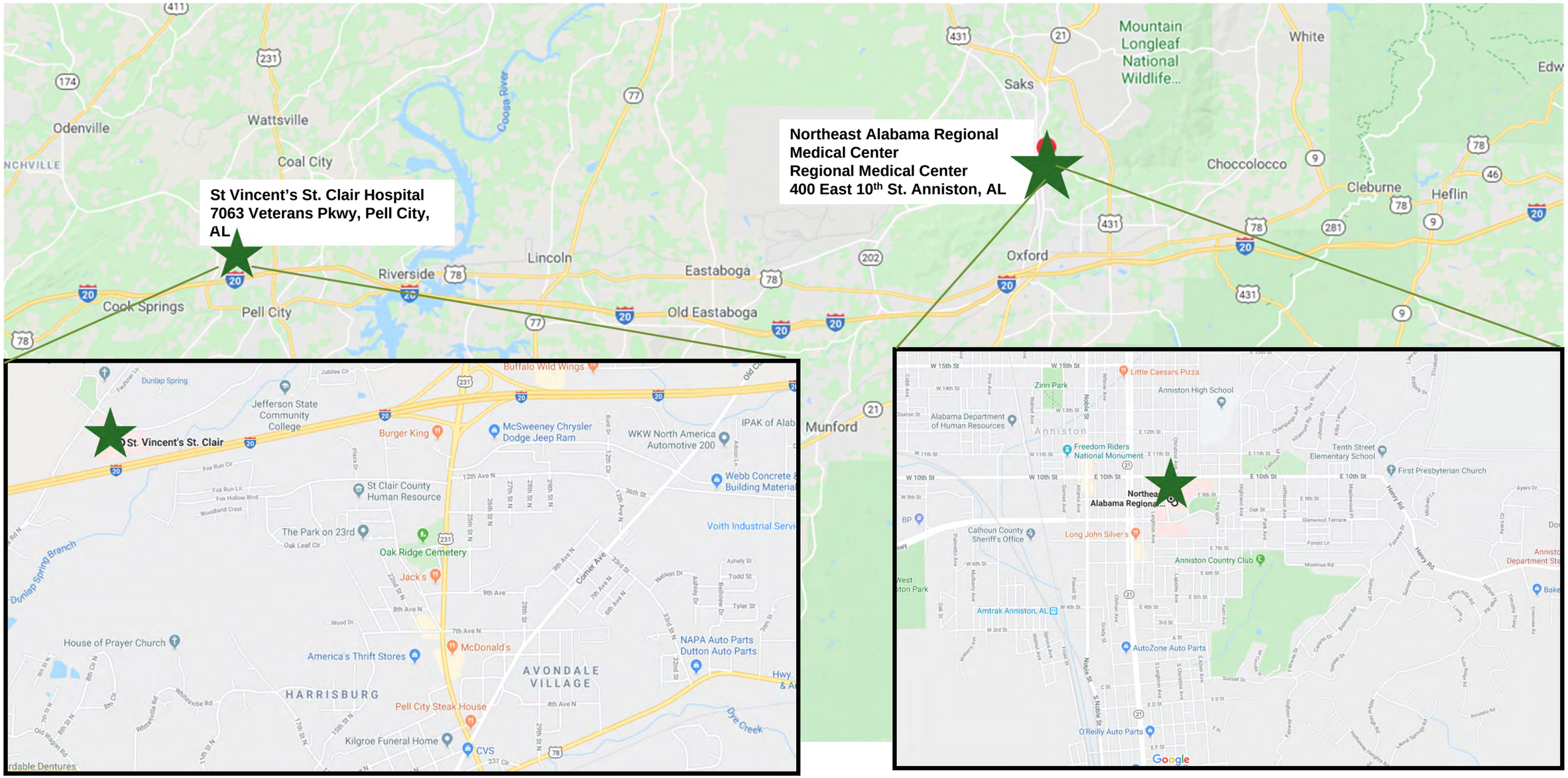
P/S. 2021. Emergency *Response Plan for Operable Unit 1/Operable Unit 2 Portion of the Anniston PCB Site*. Pharmacia LLC and Solutia Inc. May.

USEPA. 2016. *Diving Safety Manual* Revision 1.3. United States Environmental Protection Agency, Office of Administration and Resources Management, Safety and Sustainability Division. Washington, D.C. April 15.

USEPA. 2017. *Record of Decision Operable Unit 1/Operable Unit 2, Anniston PCB Site, Anniston, Calhoun County, Alabama*. United States Environmental Protection Agency. Atlanta Georgia. November.

FIGURES


Anniston, AL
Atlanta, GA
Birmingham, AL
Lake Neely Henry
Coosa River
Snow Creek
Anniston
OU-3 Facility
OU-1/OU-2 Residental and
Nonresidential Properties
Coldwater Creek
Eastaboga Creek
Pell City
Oxford
Jackson Shoals
OU-4
Choccolocco Creek
Lake Logan Martin
Cheaha Creek
Talladega
Lay Lake
Legend
Approximate Choccolocco Creek Watershed Boundary as Delineated in Basins 2.0
OU-4 100-Year Floodplain
OU-1/OU-2 Downgradient Floodplain
OU-3 Boundary
0
6
12
Miles
Graphic Scale
Notes:
OU: operable unit
PCB: polychlorinated biphenyl
Anniston PCB Site
Anniston, Alabama
OU-1/OU-2 RD/RA Health and Safety Plan
Site Location Map
Figure
1



Directions to St. Vincent's

From the East: Take I-20 W to exit 158, US-231 N/Martin Street N in Pell City. Take Hazelwood Drive and Veterans Parkway to St. Vincent's St. Clair.

Direction to Northeast Alabama Regional Medical Center

From the West: Take Highway 202 East. Pass through the intersection with Quintard Avenue, Highway 202 becomes 9th Street. The Regional Medical Center is 1.5 blocks ahead on the left.

From the South: Take Quintard Avenue North to 9th Street. Turn right on 9th Street. The Regional Medical Center is 1.5 blocks ahead on the left.

Anniston PCB Site
Anniston, Alabama
OU-1/OU-2 RD/RA Health and Safety Plan

Medical Center Locations

Solutia Ingenuity Productivity Performance

Figure **2**

ATTACHMENT A

HEALTH AND SAFETY FORMS

Emergency and Nonemergency Contacts

EMERGENCY	
Fire	911
Police	911
Ambulance	911
NONEMERGENCY	
Anniston Fire	(256) 231-7647
Anniston Police (and animal control)	(256) 238-1800
City of Oxford Police	(256) 831-3121
City of Oxford Fire	(256) 831-3208
Calhoun County Sheriff's Office	(256) 237-4731
Calhoun County Animal Control (Cheaha Regional Humane Society)	(256) 241-3647
Talladega County Sheriff's Office	(256) 362-2748
HOSPITALS: Regional Medical Center, 400 East 10th Street, Anniston, AL 36207 St Vincent's St. Clair, 7063 Veterans Pkwy, Pell City, AL 35125	(256) 235-5121 (205) 338-3301
Alabama One Call	811
Poison Control Center	(800) 222-1222
National Response Center (chemical or oil spill)	(800) 424-8802
Alabama Department of Environmental Management Emergency Response	(205) 942-6168
USEPA Project Coordinator (Pam Scully)	(404) 562-8934
USEPA Region 4 Section Chief (Derek Matory)	(404) 562-8800
Solutia Anniston PCB Site Manager (Gayle Macolly)	(256) 231-8404

PCB: polychlorinated biphenyl
USEPA: United States Environmental Protection Agency

Health and Safety Plan Acknowledgment
Anniston PCB Site, Anniston, Alabama

Health and Safety Plan (HASP) Acknowledgment for Anniston PCB Site, Anniston, Alabama			
I have read the HASP for the Anniston PCB Site (or its contents has been presented to me). I understand the contents of the HASP, and I agree to abide by the requirements laid out in the document.			
Name	**Signature**	**Representing**	**Date**

ANNISTON PCB SITE
JOB SAFETY ANALYSIS (JSA)

PART A – SITE SAFETY PLAN

A.1. PROJECT INFORMATION

Project Name:	
Project Address:	
General Work Description: **Is work in OU-3?** Yes ☐ No ☐ **If Yes, fill in Plant Representative below**	

Personnel	Company	Name	e-mail address	Phone
Client Representative:				
Plant Representative: (when work is conducted in OU-3)				
Contractor Staff:				
Project Manager				
Site Safety Officer (SSO)				
Corporate Safety Manager				
Field Operations Lead				

A.2. EMERGENCY RESPONSE

Based on analysis of worksite factors, client/regulatory requirements, and availability of emergency services.

Consider all Relevant Risk Factors & Response Procedures *(fire/explosion, medical, chemicals/spills, security, site factors, weather, communications).*
EXPLANATORY NOTES, CLARIFICATIONS:

Available Means of Jobsite Emergency Communication /Alerting	☐ Verbal ☐ Cell Phone ☐ Land Line ☐ 2-Way Radio ☐ On-site alarm/signal system ☐ Other:
To Summon Emergency Services Police, Fire, Ambulance	☐ **DIAL 911**, for external responders ☐ **Other**:
Other Emergency Contacts, as needed *(such as security, spill responder, utility)*	
Nearest Emergency Medical Services	1. Northeast Alabama Regional Medical Center, 400 East 10th St, Anniston phone: (256) 235-5121 2. St. Vincent's St. Clair Hospital, 7063 Veterans Pkwy, Pell City phone: (205) 338-3301 ☒ **See Directions (Attachment 1)**
For **Nonemergency Urgent Care**	
Jobsite **Evacuation** Procedure, Rally Point, Place of refuge	
Special Emergency Equipment/Procedures	
Is a Journey Management Plan Required?	☐ **If yes, complete Section D of this JSA**

IMPORTANT: After initial emergency response actions and incident stabilization, contact appropriate project personnel listed in Part A.1.

A.3. SUMMARY OF WORK STEPS, HAZARDS, CONTROLS

Based on **PART B, "HAZARD ANALYSIS,"** and worksite/client/project factors.

Summary/outline of work steps/hazards/controls, with references to applicable Sections in Parts B and C, as applicable:

WORK STEPS	HAZARDS	CONTROLS
<add rows or reformat as needed>		

A.4. H&S EQUIPMENT LIST

List worksite equipment for worker protection; provide details in Explanatory Notes, Clarifications.

EXPLANATORY NOTES, CLARIFICATIONS:

☐	**ROUTINE PPE** See attached checklist	☐ Work clothes appropriate for task ☐ Steel-toed boots/shoes ☐ Hardhat ☐ Safety glasses		☐ Work gloves appropriate for task ☐ Noise/hearing protection ☐ High-visibility/reflective vest ☐ Ice creepers (boot attachments)
		☐ Basic PPE for protection from low-hazard chemical contact & dust (nitrile gloves, Tyvek suit, dust mask, boot covers).		
☐	**ROUTINE H&S EQUIPMENT/GEAR**	☐ First aid kit ☐ Fire extinguisher ☐ Emergency eyewash bottle(s) ☐ Insect control (repellant, wasp spray, other) ☐ Caution tape		☐ Sun protection (sunscreen, shade canopy, other) ☐ Project-supplied drinking water ☐ Project-supplied hygiene facilities ☐ Poison ivy skin wash (Technu or similar) ☐ Vehicle emergency kit (flares, lights, reflective device) ☐ Traffic control warning devices (cones, or similar)
		☐ Other:		
☐	**NONROUTINE PERSONAL PROTECTIVE EQUIPMENT (PPE)** (Indicate specific types of PPE in Explanatory Notes, Clarifications)	☐ Goggles and/or face shield ☐ Chemical protective gloves ☐ Coveralls (Tyvek, or other) ☐ Outer boots, boot covers	☐ Disposable n-95 dust mask ☐ Half-face respirator (APR), cartridges ☐ Full-face respirator (APR), cartridges ☐ Personal flotation device	☐ Fire retardant clothing ☐ Arc flash protection ☐ Electrical-hazard-rated boots, gloves ☐ Personal fall apparatus
		☐ Other:		
☐	**SPECIAL HAZARD CONTROLS**	☐ Portable GFCI	☐ Lockout/tagout equipment	☐ Ventilation equipment (fan, blower)
		☐ Eyewash - 15 min. flow	☐ Emergency deluge shower	☐ Air horn, alarm
		☐ Other:		
☐	**DECON, PPE DISPOSAL**	☐ Receptacle for disposable PPE	☐ Hand washing provisions	☐ Decon solution, related supplies
		☐ Other:		
☐	**AIR MONITORING EQUIPMENT, OTHER EQUIPMENT FOR WORKER EXPOSURE TESTING**	List equipment/devices to be brought to worksite; Use in accordance with procedures in Part C:		

PART B – HAZARD ANALYSIS and CONTROLS *Complete Section B.1., then subsequent sections as applicable to the task(s).*

B.1. ROUTINE HAZARD PREPAREDNESS **This section required for all tasks.**

Explanatory Notes, Clarifications:

General Safety, Wellness, Preparedness – Delineate site-specific HS aspects, as appropriate, in "Explanatory Notes, Clarifications," above.

- ☐ **General premises** hazards - housekeeping, rough terrain, trip hazards, steep slope, remote location.
- ☐ **Weather/climate-related hazards** – heat stress/cold stress measures, sunscreen, severe weather shelter/refuge, at first sign of lightning stop work. Do not resume work until 30 minutes from last sign of lightning or thunder.
- ☐ **Plant/insect/animal hazards** - Precautions: poison ivy wash; insect repellant; check for ticks; hornet nest spray; animal precautions.
- ☐ **Worksite traffic hazards** – Implement measures to protect personnel (high-visibility/reflective clothing, on-person lighting, traffic control measures).
- ☐ **Illumination hazards/night work** - Illuminate work areas and/or access routes, use reflective/high-visibility clothing or on-person lighting, as appropriate.
- ☐ **Lifting, manual material handling** – use proper lifting procedures, seek help for >50 lbs.

Routine Personal Protection – Delineate site-specific HS aspects, as appropriate, in "Explanatory Notes, Clarifications," above.

- ☐ **Head protection from overhead hazards** - Wear hardhat or "bump cap" as appropriate for hazard.
- ☐ **Hand protection** - Wear protective work gloves appropriate for the hazard and work tasks.
- ☐ **Eye protection** - Wear safety glasses (with side shield or wrap around, either clear or shaded for sun protection), or other appropriate eye protection.
- ☐ **Foot protection, rough terrain** - Wear work boots/shoes with hard toes, ankle support, puncture resistance, traction, as appropriate for conditions.
- ☐ **Hearing protection** – use earplugs, earmuffs (or both) as appropriate for conditions; at a minimum where noise levels exceed 85dBA.
- ☐ **Dust, unsanitary conditions** – For general protection against minimal nonspecific hazards, use protective clothing and/or disposable dust mask, as needed.

Utility Clearance – Delineate site-specific HS aspects, as appropriate, in "Explanatory Notes, Clarifications," above.

- ☐ **Underground Utility Clearance** – See Section B.4 and confirm that utilities have been identified, marked in the field and that plan is in place to avoid.
- ☐ **Overhead Utilities -** See Section B.4 and confirm that mandatory safe distances are maintained at all times.

Tools, Equipment, Machinery – Delineate site-specific HS aspects, as appropriate, in "Explanatory Notes, Clarifications," above.

- ☐ **Manual hand tools -** proper tool for the job, maintain in good condition, use vise/clamp to hold work piece, proper follow through, stay clear of line of fire.
- ☐ **Knives, cutting tools -** Utility/folding/collapsible knives and fixed open-bladed knives/cutting tools are *not* permitted, unless specifically authorized. Cutting tools with automatically retracting blades, or with enclosed/guarded blades are permitted.
- ☐ ***Working near*** **powered tools/equipment/machinery** – safe distance, heed warning signs, stay out of line of fire, use PPE (for eye/hearing/dust protection).
- ☐ ***Operation/use of*** **powered tools/equipment/machinery – See Section B.5.**

Security– Delineate site-specific HS aspects, as appropriate, in "Explanatory Notes, Clarifications," above.

- ☐ **High crime, urban** – Use appropriate measures for personal security (such as buddy system, security service, work scheduling, other measures)
- ☐ **Working alone** - Establish check-in procedure with supervisor/project manager.

Routine Driving Hazards – Delineate site-specific HS aspects, as appropriate, in "Explanatory Notes, Clarifications," above.

- ☐ **Routine work travel** - Use routine safe/defensive driving practices (seat belts, safe speeds, eyes ahead, no tailgating, limit distractions, safe cell phone use, no texting, clear windows, account for weather/road conditions, adequate sleep, other measures as appropriate).
- ☐ **Unfamiliar location** - Plan travel route before driving (assemble maps, enter destination in GPS).
- ☐ **Long distance or during sleep hours** – Minimize fatigue: rest breaks, light snacks (avoid heavy meals), stay hydrated, fresh air, no loud music, clean windshield.
- ☐ **Unfamiliar vehicle** – Become familiar with vehicle operational controls and handling characteristics *before* operating vehicle.

B.2. SPECIAL DRIVING/TRAFFIC/TRANSPORTATION HAZARDS ☐ Applicable ☐ Not Applicable		
EXPLANATORY NOTES, CLARIFICATIONS:		
☐	**SPECIAL DRIVING HAZARDS** Off-road driving or use of non-typical vehicle, heavy vehicle, van, golf/utility cart, ATV Hazards: Worker injury due to vehicle collision, rollover	☐ For off- road driving, do not exceed capability of vehicle, beware of wet conditions, speed low, avoid unsafe orientation on slopes. ☐ Follow ATV-specific procedures for training, safety equipment, operation, manufacturer's instructions. ☐ Special skills required for vehicle type - For vehicles requiring special skills (such as windowless van, heavy work vehicle, utility vehicle) ensure operator is provided training and/or has appropriate operator skills through experience.
☐	**TRANSPORTING MATERIALS, TOWING/HAULING LOADS** Hazards: Vehicle accident, occupant injury from shifting load, unsafe equipment.	☐ Ensure load is firmly secured (rope, straps, load configuration) to prevent shifting during travel. ☐ Slings, chains, strap, rope and related equipment used for towing, hauling, load-securing shall be appropriate for use and used in a manner as to prevent an unsafe condition. ☐ For trailer use, verify signal/braking lights operational, rear-view mirrors effective, hitch/safety chains secure.
☐	**WORKSITE TRAFFIC HAZARDS** Where the project worksite is located in/near vehicle thoroughfare. Hazards: Worker injury from being struck by vehicle traveling in thoroughfare.	☐ Wear reflective vests where exposed to traffic hazards. ☐ Where possible, park vehicles as protective shield from oncoming traffic. ☐ Configure work area and support vehicles to minimize worker exposure to traffic hazards. ☐ Use Department of Transportation (DOT) signal devices to reroute vehicles around work area, site entrances/exits. ☐ Use DOT-trained flaggers or police detail where appropriate or required.
☐	**RAILROAD HAZARD** Hazard: Worker injury from being struck by train in railroad right-of-way	☐ Coordinate with rail company and implement required safety and security measures. ☐ Site workers to receive safety training for railroad work.
☐	**WATER TRANSPORTATION**	☐ Personal flotation devices required when working with 5 feet of a water body ☐ Safe watercraft and appropriated trained operating personnel
☐	**AIRPORT, AIRCRAFT** Worker injury when working on/near airport runway, or use of helicopter, light aircraft	☐ Coordinate safety requirements with airport personnel and implement required safety measures. ☐ Site workers to receive safety training for railroad/airport work. ☐ Follow provisions of applicable HS procedures.
☐	**TRAFFIC/VEHICLE HAZARDS RELATED TO HEAVY EQUIPMENT, CONSTRUCTION SITE ACTIVITIES**	☐ See Section B.8., "Construction, Heavy Equipment, Lift Equipment"

B.3. WATER/BOATING HAZARDS ☐ Applicable ☐ Not Applicable		
EXPLANATORY NOTES, CLARIFICATIONS:		
☐	**OPERATOR OF WATERCRAFT OR PASSENGER/WORKER ON WATERCRAFT OR PLATFORM** Hazards: Drowning, hypothermia, collision, motor/fuel hazards, navigation	☐ Wear regulatory-approved personal flotation device or buoyant work vest. ☐ Bring emergency rescue equipment (ring buoy, reaching device, flares). Use "reach, throw, row, go" strategy. ☐ Use fuel safety practices, fire extinguisher present in boat. ☐ Have lifesaving skiff/boat available. ☐ Monitor weather, develop float plan, ensure navigation/communication equipment is operable. ☐ For tidal, flash flood, dam release hazards, plan/locate work accordingly, other precautions as appropriate. ☐ Where ice/slip hazards are present adjacent to water body and for working directly on ice over water, wear ice creepers, sand work area, or take other appropriate measures to address slip hazard. ☐ For high-hazard work over very cold water, have immersion survival suit available, as appropriate. ☐ For electrical hazards associated with water/wet locations, see Section B.9., "Electrical Hazards."
☐	**WORK NEAR WATER HAZARDS OR ENTERING WATER** Hazards: drowning, hypothermia from water immersion, related injuries. ☐ Wading, wetland, mud/silt ☐ Dam release, flash flood, tide ☐ Diving ☐ Ice on/near water body	

B.4. UTILITY-RELATED HAZARDS	☐ Applicable	☐ Not Applicable
EXPLANATORY NOTES, CLARIFICATIONS:		
☐	**OVERHEAD, ABOVEGROUND UTILITIES**	☐ Maintain proper clearance, employ other appropriate precautions for the conditions.
☐	**UNDERGROUND UTILITIES**	☐ Confirm appropriate underground utility clearance procedures have been completed prior to ground penetrations, and employ other utility clearance/locator practices, as appropriate for conditions. ☐ Hand digging or vacuum post-holing within 3 feet of utility locations or other high-risk condition.
NOTE: if Utility-related hazards are applicable, the Utilities Checklist attached to this JSA MUST be completed. (Attachment 2)		

B.5. POWERED TOOLS, EQUIPMENT, MACHINERY	☐ Applicable	☐ Not Applicable
EXPLANATORY NOTES, CLARIFICATIONS:		
☐	**POWERED HAND TOOLS** ☐ Battery-operated ☐ Electric-powered, 120v/240v ☐ Fuel-powered ☐ Pneumatic ☐ Powder-actuated Hazards: Eye/hand/body injury, fuel-related hazards, Inhalation hazards, noise, sparks, heat, fire hazard, electrical hazards	☐ For all power tools: • Inspect tools to ensure safe operating condition before each use. • Use tool in accordance with manufacturer's specifications. • Ensure guards are in place and no hazardous equipment modifications. • Use PPE or other safety practices, as appropriate, for eye/hearing/hand/head/body protection. • Provide training or verify operator competency for use of power tool. • Stay clear of hazard zone (line of fire) when working near where power tools are used. • For spark- or heat-generating tool, control fire hazards, segregate combustible/flammable materials. • Use vise/clamp/work bench or other appropriate means to hold/secure the work piece. ☐ Use respirators, ventilation, wet methods, other appropriate means to control inhalation hazard. ☐ See fuel-safety practices in Section B.13., "Commercial Chemical Products." ☐ For electrical hazards, see Section B.9., "Electrical Hazards."
☐	**OPERATION OF EQUIPMENT/MACHINERY** ☐ Point-of-operation hazards ☐ Pinch points, moving parts ☐ Struck by, caught between ☐ Hot surfaces, heat ☐ Extension cords, flexible wire ☐ Fuel related (gas or liquid) ☐ Hydraulic pressure ☐ Pneumatic pressure ☐ Kinetic, stored energy ☐ Noise ☐ Emissions, discharge gases ☐ Working at heights, falls ☐ Lifting, repetitive motion ☐ Illumination ☐ Electrical	☐ <u>General safety requirements for equipment, machinery:</u> • Arrange worksite for safe access to equipment/machinery. • Use equipment/machinery in accordance with manufacturer's use and safety instructions. • Ensure point-of-operation, mechanical power transmission, other moving parts are guarded with protective devices; do not override interlocks, guards, protective devices. • Secure long hair/loose clothing/hanging jewelry near moving or rotating parts. • Heed warning signs/labels, keep safe distance; avoid locations of struck-by and caught-between hazards. • Implement lockout/tagout for repairs/adjustments/tooling changes. ☐ Use safe lifting practices for movement of heavy portable equipment ☐ Implement safe work practices for compressed air, pressurized systems (pneumatic/hydraulic), stored energy. ☐ For climbing/fall hazards associated with large equipment, see Section B.6., "Fall Hazards." ☐ For electrical hazards, see Section B.9., "Electrical Hazards." ☐ Operate fuel-powered equipment in well ventilated location. ☐ Use safe practices for fuels, see Section B.13., "Commercial Chemical Products."
☐	**LOCKOUT/TAGOUT OF HAZARDOUS ENERGY**	☐ Implement control-of-hazardous-energy practices (lockout/tagout), provide lockout/tagout locks and devices, training workers, designate authorized personnel, notify affected personnel.
☐	**WELDING, CUTTING, HOT WORK (GAS OR ARC)** UV/IR light-eye/skin burns, hot-work hazards, toxic welding fumes, compressed gases, electrical shock	☐ <u>General safe work practices:</u> • Hot work permit system to be implemented. • Operator properly protected (eye protection, clothing, apron, etc.). • Fire hazard controls (watcher, fire extinguisher, water, isolate combustibles). • Protect nearby personnel from hazardous UV, IR light (shielding, curtain). ☐ For gas welding/cutting, use gas cylinder safe practices (secured, upright, caps on when not in use, prevent damage; never secure gas cylinders to metal bench used for arc welding). ☐ For arc welding, follow electrical safe work practices. See Section B.9., "Electrical Hazards." ☐ See Section B.13., "Commercial Chemical Products," for hazards of welding rods (toxic metals), welding gases.

B.5. POWERED TOOLS, EQUIPMENT, MACHINERY Cont.		
☐	**COMPRESSED AIR, COMPRESSOR** (for compressed gases, see Section B.13., "Compressed Gases")	☐ Never direct nozzle toward body; do not use compressed air for cleaning clothes. ☐ If compressed air is used for cleaning, restrict pressure to 30 psi or below, equip nozzle with chip guard. ☐ Use eye protection. ☐ Ensure air tank, hoses, fittings are in good repair using factory fittings.
☐	**PORTABLE GENERATOR** Hazards: Electrical shock, carbon monoxide in exhaust, fuel-related fire, injury from mechanical hazards, lifting	☐ Follow general safety practices for Operation of Equipment/Machinery (above), and as follows: • Use in accordance with manufacturer's instructions. • Keep generator and work area dry. • Never use indoors or near building air intake vents due to carbon monoxide hazard. • Provide for ventilation and/or air monitoring where hazardous accumulation of exhaust emissions is possible. • Use hearing protection in close proximity to operating generator, as needed. • Use power cords/extension cords specified by instructions. • Use ground-fault circuit interrupters (GFCIs) in accordance with manufacturer's instructions. • See Section B.9., "Electrical Hazards." • Shut down equipment before refueling. See safe practices for flammable/combustible liquids in Section B.13., "Commercial Chemical Products."
☐	**PORTABLE HEATERS** **(electric or fuel powered)** Hazards: Electric-powered: Electrical shock, fires from hot surfaces. Fuel powered: Carbon monoxide in exhaust, fires from hot surfaces, fuel-related fires	☐ Follow general safety practices for Operation of Equipment/Machinery (above), and as follows: • Keep heater dry, and locate heater on level surface away from high traffic areas. • Never use fuel-powered heaters indoors or near air intake vents, due to carbon monoxide hazard. • Provide for ventilation and/or air monitoring where hazardous accumulation of exhaust emissions is possible. • Keep combustible materials at least 3 feet from hot surfaces. • Do not use an extension cord or power strip to power an electric heater. • For electric heaters, See Section B.9., "Electrical Hazards." • Shut down fuel-powered equipment before refueling. See safe practices for flammable/combustible liquids and/or compressed gases in Section B.13., "Commercial Chemical Products."

B.6. FALL HAZARDS	☐ Applicable	☐ Not Applicable

EXPLANATORY NOTES, CLARIFICATIONS:

☐	**WORKING AT HEIGHTS (GENERAL)** Hazards: Falls, overhead hazards, impalement hazard (such as from falling onto unprotected rebar and similar)	General fall protection requirement thresholds: required at >4 feet (industry), >6 feet (construction), >10 feet (scaffolds) ☐ Ensure guardrails present. ☐ Use personal fall apparatus. ☐ Use tether or positioning device. ☐ Restrict access to hazard (barriers, tape, sign). ☐ Ensure covers in place over holes. ☐ Use designated watch person. ☐ Use fall protection net. ☐ Restrict access beneath work to protect other site. personnel from overhead hazards. ☐ Ensure safe access to elevated work location (ladder, stairs). ☐ Install caps on protruding rebar.
☐	**LADDERS / STAIRS** ☐ Extension/straight ladders ☐ Step ladders ☐ Fixed ladders ☐ Stairs Hazards: Falls, overhead hazards	☐ Follow safe work practices: • Use ladders according to safe practices and manufacturer's instructions. • Maintain three points of contact at all times on ladder; keep center of gravity within side rails. • Do not use metal (conductive) ladder near electrical hazard. • Extension/straight ladders shall be properly footed, secured, angled, extend above upper work surface. • Stepladders are set on level ground or properly shimmed, spreaders locked; do not climb/stand on top step, top cap, or rear non-climbing side; use step ladder of sufficient length for work. • Equip stairs with stair-rails where more than 4 steps, and for stairway height 4 feet or more.
☐	**SCAFFOLD** ☐ Supported scaffold ☐ Suspended scaffold ☐ Free-standing/mobile scaffold Hazards: Falls, overhead hazards, equipment collapse	☐ Follow safe work practices: • Identify/coordinate operations with subcontractor's competent person. • Supported scaffold level, stable, proper attachments, tiebacks, planking. • Suspended scaffolds anchored properly. • Guardrails or personal fall apparatus required above 10 feet. • Proper means of accessing scaffold (proper ladders, stair tower). • Total height of free-standing scaffold not to exceed four times the minimum base dimension. • Do not exceed load limits; store/stage materials in quantities sufficient for immediate use.
☐	**AERIAL LIFT** Hazards: Falls, overhead hazards, struck by, run-over, caught between (pinch points), tip over, fluid leaks	☐ Follow safe work practices: • Operators to be sufficiently trained, experienced, and qualified. • Equipment is inspected after mobilization and is in good condition. • Harness and lanyard worn whenever operating the lift (possible exception for scissor lifts). • Overhead and surface obstructions to be reviewed with operators prior to use.
☐	**IMPORTANT!** This work may/will include close proximity to overhead electric utility lines.	☐ Follow safe work practices per Section B.4., "Utility Related Hazards."

B.7. DRILLING	☐ Applicable	☐ Not Applicable

EXPLANATORY NOTES, CLARIFICATIONS:

☐	**DRILLING** Hazards: Struck by, run-over, caught between (pinch points), manual lifting, roll over, fluid leaks, fuel hazards, suspended equipment	☐ Follow safe work practices, as applicable: • Nonessential personnel to stay clear of drilling work zone when drill rig in operation. • Equipment inspected daily upon mobilization; maintained in good repair, backup alarms. • Leaks or defective safety equipment should be repaired before use. • Establish eye contact with operator, and use hand signals prior to approaching near equipment. • PPE used near operating rig (eye/head/hearing/hand/foot protection, high-visibility vests or equivalent). • Contractor inspects drill rig daily before use, verify daily that emergency stop is functional. • Drill rig to be equipped with operational emergency stop, equipment in good repair, machine guards in place, whip checks on high-pressure lines. • Park personal/support vehicles in a location as to not obstruct travel lanes or other site operations. • Operators/helpers maintain safe distance from moving parts; secure loose hair, loose clothing, equipment. • Drill rigs will only be moved with masts lowered. • Max. safe slope for rig will be followed, drill rig leveled, appropriate blocking/cribbing as needed. • Use safety practices for refueling, fuel handling/storage/transport. • Spill equipment is available for fuel and hydraulic fluid leaks. • Verify mechanical lift/rigging equipment (cables, sheaves, boom, attachments) is in proper working order. • Ventilate and conduct air monitoring, as appropriate, when drilling indoors.
☐	**IMPORTANT!** This work may/will include close proximity to overhead electric utility lines.	☐ Follow safe work practices per Section B.4., "Utility Related Hazards."

B.8. CONSTRUCTION, HEAVY EQUIPMENT, LIFT EQUIPMENT ☐ Applicable ☐ Not Applicable		
EXPLANATORY NOTES, CLARIFICATIONS:		
☐	**HEAVY EQUIPMENT** Hazards: Struck by, run-over, caught between (pinch points), roll over, fluid leaks, overhead hazards	☐ Follow general safe work practices for heavy equipment: • Trained/qualified persons operate all heavy equipment. • Do not get into a potential crush situation below or between equipment or in an excavation. • No passengers on moving/operating equipment except where passenger seat/restraint is present. • Equipment inspected daily upon mobilization; maintained in good repair, backup alarms. • Leaks or defective safety equipment should be repaired before use. • Operators required to use seatbelts. • Maintain eye contact with operator and use hand signals prior to approaching near equipment. • High-visibility vests for all personnel in construction vehicle work area, on-site roadways and travel lanes. • Maximum safe slope for each vehicle will be followed. • Personnel to stay clear of, or restrict access to, swing radius and travel path of equipment. • Spill equipment available for fuel and hydraulic fluid leaks. • Equipment locked, secured, brakes set, buckets/forks lowered, when not in use. • Park personal/support vehicles in a location as to not obstruct travel lanes or other site operations. • Mark temporary roadways clearly, provide berms/stop logs where needed.
☐	**CRANES** Hazards: electrocution by overhead utility; injury in swing radius; injury from falling load; crane tipping over due to overbalancing, high winds, unstable ground, unsafe slope, bad placement of outriggers; injury from mechanical hazards	☐ In addition to general safety practices for heavy equipment (above), as applicable: • Only qualified persons operate cranes (certificate required). • Critical Lift Plan & Checklist prepared/executed prior to mobilization. • Equipment to be inspected prior to mobilization and daily by crane operator. • Crane operator will remain at the controls at all times during operation. • Crane operation must be performed under the direction of an appointed signal person at all times. • Communication between crane operator and signal person will be maintained through standard hand signals or voice communication equipment. • Keep area beneath suspended loads clear of personnel. • Rigging procedures – see "Mechanical Lifting, Rigging," below.
☐	**MECHANICAL LIFTING, RIGGING** Applies to lifting by crane, truck-mounted boom rig (e.g. drill rig), mechanical/electrical hoist, similar equipment. Hazards: falling loads, personnel under suspended loads.	☐ In addition to general safety practices for heavy equipment and cranes (above), as applicable: • Coordinate lifting operations with competent person. • Do not exceed loading limits of lifting equipment; perform work in accordance with equipment load chart. • Slings, chains, rope, wire rope, and related equipment used for lifting shall be maintained in good condition, and used in a manner as to protect from damage. • Rigging, wire rope, and hoisting equipment will be inspected and maintained on a weekly basis. • Hooks will be equipped with safety latches. • Ensure anchor points for winch or other lift device (such as davit arm) are engineered for intended use.
☐	**FORKLIFT** Hazards: Struck by, run-over, overhead hazards, caught between (pinch points), roll over, fluid leaks.	☐ In addition to general safety practices for heavy equipment (above), as applicable: • Qualified operator, per established forklift training (certificate is required). • Equipment inspected daily and documented on Forklift Preoperational Inspection Checklist. • Do not exceed lifting load limits. • Forklift shall not be moved/driven with empty forks in raised position. • When not in use, forks lowered, brake set, controls in neutral, key removed.
☐	**AERIAL LIFTS**	☐ See Section B.6., "Fall Hazards."
☐	**TRENCHING/EXCAVATION** Hazards: Cave-in, hazardous atmosphere, structures & foundations, falls into excavations	☐ Safe work practices when personnel will enter trenches/excavations: • Activities under supervision/oversight of competent person, daily inspection. • Excavated materials placed at least 2 feet from trench sidewall. • Prevent water accumulation in trench. • Sloping and shoring for excavations ≥ 20 feet must be approved by a professional engineer. • Sloping/shoring/trench box for excavations ≥ 5 feet when persons enter trench/excavation. • Sloping/shoring/trench box for shallow (< 5 feet) excavations with cave-in hazard. • Workers in trenches to be within 25 feet of ladder or sloped entryway. • Excavations to be protected by perimeter fencing (not barricade tape), if potential for personnel to fall into. • If potential for atmospheric hazard, see Section B.10, "Confined Space Entry, Hazardous Enclosed Spaces."

B.8. CONSTRUCTION, HEAVY EQUIPMENT, LIFT EQUIPMENT Cont.		
☐	**IMPORTANT!** This work may/will include close proximity to overhead and/or underground utility lines.	☐ Follow safe work practices per Section B.4., "Utility Related Hazards."
☐	**DEMOLITION**	☐ Develop/implement demolition safety plan.
☐	**BLASTING**	☐ Develop/implement blasting safety plan.
☐	**PUBLIC AT RISK, SITE SECURITY**	☐ During site operations protect public (overhead protection, barriers, warning signs). ☐ During off hours, protect public with barriers, warning signs/lights, other measures as appropriate. ☐ Lock/secure hazardous materials and equipment.

B.9. ELECTRICAL HAZARDS ☐ Applicable ☐ Not Applicable		
EXPLANATORY NOTES, CLARIFICATIONS:		
☐	**BASIC ELECTRICAL HAZARDS TO SKILLED NONELECTRICAL WORKERS** Equipment/tool use/operation, use of extension cords, working near electrical equipment. Hazards: Electrical shock, secondary hazards (falls, other injuries).	☐ Follow safe work practices: • Control water-related/wet-location hazards in a manner appropriate for the job tasks/equipment/tool. • Never touch electrical equipment if you are wet or standing in water or on wet surfaces. • Use extension cords/power cords properly, prevent damage, take out of service if damaged. • Inspect tool/equipment/extension cords/power cords/welding cables before each use; do not use if damaged. • Use GFCI-protected outlet or portable GFCI in wet locations, outdoors, basements, concrete floors. • Ensure live parts are guarded, enclosures secure. • Enclosures, circuits properly labeled.
☐	**HANDS-ON ELECTRICAL WORK BY ELECTRICAL WORKER/TECHNICIAN:** ☐ Voltage < 50v ☐ Voltage 50–600v ☐ Voltage > 600v ☐ AC ☐ DC ☐ 3-phase ☐ Battery and/or solar power ☐ Capacitor/transformer	☐ Implement electrical safe work practices pertaining to: • Worker training/qualification (Level 1, Level 2, Level 3) • General electrical safe work practices, grounding, use of GFCIs • Safe work practices during diagnostics/troubleshooting, maintenance, repair • Safe design features for electrical equipment • Arc flash protection
☐	**LOCKOUT/TAGOUT OF ELECTRICAL ENERGY**	☐ Implement control-of-hazardous-energy practices (lockout/tagout), provide lockout/tagout locks and devices, training workers, designate authorized personnel, notify affected personnel.
☐	**IMPORTANT!** This work may/will include close proximity to electric utility lines.	☐ Follow safe work practices per Section B.4., "Utility Related Hazards."

B.10. CONFINED SPACE ENTRY, HAZARDOUS ENCLOSED SPACES ☐ Applicable ☐ Not Applicable

EXPLANATORY NOTES, CLARIFICATIONS:

☐	**CONFINED SPACE(S)** Potential/actual hazards: ☐ Atmospheric hazards: ☐ Flammable/explosive ☐ Oxygen deficiency ☐ Hydrogen sulfide ☐ Other toxic ☐ Combustible dust ☐ Electrical ☐ Mechanical, engulfment, entrapment, stored energy	☐ Develop effective site-specific entry procedure **per applicable regulatory requirements**: • Personnel to be trained/qualified. • Hazards properly characterized • Use equipment necessary for safe entry (for access, retrieval, PPE, air monitoring, ventilation). • Develop measures for emergency rescue, as applicable. • IMPORTANT: - Describe site-specific safety measures above in Explanatory Notes, Clarifications. - Modify this JSA or attach separate confined space safety plan/permit, as appropriate. ☐ Protect non-entry personnel working near confined spaces through control measures to prevent unauthorized entry (such as safety orientation, labeling, delineation, barriers).
☐	**HAZARDOUS ENCLOSED OR INDOOR SPACE(S)** ☐ Indoors (occupied or vacant) ☐ Machine/equipment pit/vault ☐ Basement/crawl space ☐ Tunnel, shaft, gallery ☐ Trench, excavation ☐ Hazardous exhaust or emissions ☐ Building-related hazards	☐ Use personal protective clothing to protect from chemical, physical, biological hazards. ☐ Use respiratory protection, if necessary/appropriate. ☐ Duct equipment exhaust to outdoors using passive duct or active exhaust ventilation. ☐ Use fans, blowers, or other effective means of ventilation to introduce fresh air/dissipate atmospheric hazards. ☐ Conduct air monitoring, as appropriate for conditions and hazards (see Part C, "Air Monitoring"). ☐ For a trench/excavation, also see subsection entitled "Trenching/Excavation" in Section B.8. "Construction, Heavy Equipment, Lift Equipment." ☐ If space classified/regulated as a "confined space," follow confined space entry requirements (above).

B.11. STORAGE OF BULK MATERIALS ☐ Applicable ☐ Not Applicable

EXPLANATORY NOTES, CLARIFICATIONS:

☐	**STORAGE OF BULK MATERIALS** (for Storage of Hazardous Materials, See Section B.13.)	☐ Store materials in stable manner (stacked, racked, blocked, interlocked, tied, wrapped, or otherwise secured) to prevent tipping, sliding, rolling, falling or collapse. ☐ Do not exceed load limits of racks, platform, scaffold; ensure racks are stable, robust, secure. ☐ Ensure stored materials do not block aisles, passageways.

B.12. INFECTIOUS / ALLERGENIC BIOHAZARDS ☐ Applicable ☐ Not Applicable

EXPLANATORY NOTES, CLARIFICATIONS:

☐	☐ Wastewater, sewer ☐ Bird guano ☐ Mold, fungi, Valley Fever ☐ Bloodborne pathogens ☐ Other (describe above)	☐ Low hazard - use basic hygiene practices, protective gloves, provide for hand washing. ☐ More severe hazard - add protective clothing, respirator/dust mask, decon, as appropriate. ☐ For human pathogens use "Universal Precautions" per Bloodborne Pathogen Program.

B.13. COMMERCIAL CHEMICAL PRODUCTS ☐ Applicable		☐ Not Applicable
EXPLANATORY NOTES, CLARIFICATIONS:		
☐	**PRODUCTS REGULATED BY HAZARD COMMUNICATION STANDARD**	☐ Safety Data Sheets available, either on-site or readily available within same work shift, containers labelled properly, workers trained/oriented on hazards. ☐ For subcontractor use of chemical products, coordinate/discuss during safety meetings. ☐ Conduct air monitoring, as appropriate (see Part C, "Air Monitoring, Worker Exposure Monitoring").
☐	**COMPRESSED GAS (flammable or nonflammable)**	☐ Secure cylinders upright, caps on when not in use, handle with care, prevent damage. ☐ Propane cylinders not in use must be stored outdoors in cage or similar secure enclosure. ☐ Ensure acetylene cylinders NOT secured to steel arc welding bench. ☐ Store/use in a manner to prevent asphyxiation hazard. ☐ Segregate oxygen and fuel gases by distance (20 feet) or barrier. ☐ Control ignition sources. ☐ "No smoking" signage at cylinder storage area for flammable gases. ☐ Use/store in a manner to control inhalation exposure hazards, PPE, air monitoring.
☐	**FLAMMABLE/COMBUSTIBLE LIQUIDS**	☐ Proper storage (flammable storage cabinets, other storage precautions). ☐ Use proper fuel safety can (metal fuel can preferred). ☐ Control ignition sources. ☐ Grounding and bonding where appropriate.
☐	**ACIDS, CAUSTICS, OTHER CORROSIVES**	☐ Handle with care, use appropriate eye/face/skin protection. ☐ Eyewash, deluge shower, drench hose, hand washing (with water), as appropriate.
☐	**TOXIC**	☐ For toxic substances, use/store in a manner to control exposure hazards (inhalation, ingestion, skin contact, skin absorption); use PPE as appropriate, conduct air monitoring as appropriate.
☐	**EMISSIONS FROM FUEL COMBUSTION, INDUSTRIAL PROCESSES** ☐ Gasoline ☐ Diesel ☐ Propane/natural gas ☐ Welding/cutting/hot work ☐ Vehicle/equipment exhaust ☐ Other	☐ Position outdoor personnel upwind of exhaust source. ☐ Use blowers, fans to provide fresh air to work area and dissipate atmospheric hazards. ☐ Use respiratory protection for high levels of smoke, exhaust particulates, soot. ☐ Conduct air monitoring as appropriate (see Part C, "Air Monitoring").
☐	**OTHER HAZARDS**	☐ Describe other hazardous substances and safety measures under "Explanatory Notes, Clarifications," above.
☐	**CHEMICAL/HAZMAT STORAGE** Check this when jobsite requirements include special provisions for chemical storage.	☐ Chemical storage cabinet, cage, storage room, or similar. ☐ Ensure incompatible chemicals are segregated. ☐ Provide secondary containment. ☐ Locate special safety equipment near chemical storage

B.14. SITE CONTAMINANTS, CHEMICAL WASTES ☐ Applicable ☐ Not Applicable

EXPLANATORY NOTES, CLARIFICATIONS:

CHECK ALL THAT APPLY. Provide explanatory notes above.

☐ Soil/groundwater contaminants (historical release)	☐ Oxygen deficiency	☐ Corrosive, acids/caustics, strong irritants
☐ Recent release, known high concentrations	☐ Chlorinated volatile organic compounds (VOCs)	☐ Sulfides, hydrogen sulfide (H_2S)
☐ Former chemical disposal site, landfill	☐ BTEX, petroleum-derived VOCs	☐ Cyanides, hydrogen cyanide (HCN)
☐ Urban fill, residual contaminants	☐ Fuel oils, petroleum, waste oil, lubricants	☐ Asbestos
☐ Containerized waste (drums, process equipment)	☐ Metals, metal compounds, metal dusts	☐ Lead paint
☐ Buried drums (known or potential)	☐ Elemental mercury	☐ Pesticides, herbicides, fungicides
☐ Large containers, potential for spills	☐ Polycyclic aromatic hydrocarbons (PAHs)	☐ Sensitizers
☐ Contaminated building surfaces	☐ Polychlorinated biphenyls (PCBs)	☐ Radioactive contaminants
☐ Unexploded ordnance	☐ Potential for flammable vapors	☐ Other (see Explanatory Notes, above)
☐ Explosive dust	☐ Potential for flammable gas (methane)	

☐ **FOR WORK CONSISTING OF CLEANUP OPERATIONS, CORRECTIVE ACTIONS, PRELIMINARY INVESTIGATIONS at an "UNCONTROLLED HAZ. WASTE SITE" (per HAZWOPER, 29 CFR 1910.120), implement the following if and when applicable to the work:**

- Implement site control plan via Exclusion Zone(s), Contaminant Reduction Zone(s) and Support Zone (aka EZ, CRZ, SZ)
- Workers to be aware of and trained on hazards per OSHA Hazard Communication Standard.
- Include site map/figure depicting work locations and other relevant site-specific information.
- Site workers in EZ or CRZ to have OSHA 40-hour training, current 8-hour refresher, 3 days supervised field experience.
- Site supervisor(s) required to have 8-hour supervisor training.
- Site workers in EZ or CRZ to participate in medical monitoring program, as applicable.
- Implement site-specific procedures for worker protection via engineering controls, work practices, PPE, air monitoring, decontamination procedures, spill containment, emergency preparedness and response.
- Conduct air monitoring, as appropriate (see Part C, "Air Monitoring, Worker Exposure Monitoring").

IMPORTANT: Provide supplemental information to sufficiently detail site-specific procedures for the above elements, as appropriate for the work.

☐ **FOR SITE WITH CHEMICAL CONTAMINANTS OR WASTE BUT NOT REGULATED BY HAZWOPER**

- Workers to be knowledgeable/aware of chemical hazards through safety training/orientation and availability of hazard information.
- Implement controls to minimize worker exposure through engineering controls, work practices, PPE, as appropriate.
- Conduct air monitoring/sampling to monitor/evaluate worker exposure, as applicable.

☐	**OFF-SITE MIGRATION OF CONTAMINANTS**	☐ Implement controls to minimize hazard migration (dust suppression, covers, foam, etc.). ☐ Community/perimeter air monitoring to be conducted per perimeter air monitoring plan.
☐	**SPILL CONTAINMENT, CONTAINERS**	☐ Describe above any site-specific procedures for spill containment, container handling, as applicable.

B.15. RADIATION HAZARDS (Other than Sunlight) ☐ Applicable ☐ Not Applicable

EXPLANATORY NOTES, CLARIFICATIONS:

☐	**IONIZING RADIATION**	Describe hazards and safety measures above in Explanatory Notes, Clarifications. Conduct exposure monitoring, as appropriate (see Part C, "Air Monitoring, Worker Exposure Monitoring").
☐	**NONIONIZING RADIATION**	Describe hazards and safety measures above in Explanatory Notes, Clarifications. Conduct exposure monitoring, as appropriate (see Part C, "Air Monitoring, Worker Exposure Monitoring").

B.16. HAZMAT/DANGEROUS GOODS SHIPPING/TRANSPORTATION ☐ Applicable ☐ Not Applicable

MODE(S) OF TRANSPORT:	☐ Road	☐ Rail	☐ Air	☐ Sea	☐ Inland Waterway	☐ International

IMPORTANT: Ensure that each individual who will be involved in shipping/transportation of hazardous material is current with required training (awareness, function-specific, safety, security) in accordance with applicable regulatory authority (DOT, FAA, IATA, TDG), and ensure adherence to applicable regulations.

EXPLANATORY NOTES, CLARIFICATIONS:

PART C – AIR MONITORING, WORKER EXPOSURE MONITORING

C.1. AIR MONITORING (Direct-Reading Instruments) ☐ Applicable ☐ Not Applicable

EXPLANATORY NOTES, CLARIFICATIONS:

☐	**AIR-TESTING PARAMETERS**	☐ VOCs, gases ☐ PID, Lamp energy: __ eV ☐ FID ☐ Carbon monoxide ☐ Hydrogen sulfide ☐ Oxygen (O_2)	☐ Flammable gas (LEL) ☐ Particulate (dust) ☐ Calibration kit for each parameter ☐ Other:

☐	**ACTION LEVELS FOR O2/LEL**	☐ Oxygen	≤19.5% - ventilate to raise O_2 to acceptable levels, or use Level B. ≥23.0% - ventilate to lower O_2 to acceptable levels, or use Level B and control fire hazards and ignition sources.
		☐ LEL	Confirm at least 12% oxygen is present to ensure accuracy of LEL readings. At <10% LEL - continue working, continue to monitor LEL levels At ≥10% LEL- immediately withdraw from area. Resume work ONLY after LEL readings reduced to <10%.

☐	**ACTION LEVELS FOR TOXICS** (sustained breathing zone concentrations)	**Parameters**	**Level D, Modified D***	**Use levels C or B*, as indicated below, OR take action to reduce breathing zone level to concentration acceptable for Level D*.**
		☐ VOCs	< __ ppm	__ ppm to __ ppm: Level C (air purifying respirator) > __ ppm: Level B (air-supplied respirator)
		☐ Carbon Monoxide	< 35 ppm	≥35 ppm - Level B (air-supplied respirator)
		☐ Hydrogen Sulfide	< 10 ppm	≥10 ppm - Level B (air-supplied respirator)
		☐		
		☐		

	PROJECT SPECIFIC MONITORING FOR DUST (TWA for an an 8 hour work day)	**Parameter**	**Implement additional controls or revise work approach**	**Stop work and develop alternate work approach**
		☒ Total Dust	1.5 mg/m^3	2.5 mg/m^3

*** Levels of Protection:**
Level D (standard work clothes, basic personal protective wear, no chemical protective clothing, no respiratory protection)
Modified Level D (chemical protective clothing in addition to standard work clothes, no respiratory protection)
Level C (air purifying respirator or dust mask, in addition to chemical-protective clothing)
Level B or A (air supplied respirator, chemical-protective suit; fully encapsulating suit for Level A)

C.2. OTHER WORKER EXPOSURE MONITORING ☐ Applicable ☐ Not Applicable

☐ Air sampling (sample collection, passive dosimeter)	☐ Ionizing or nonionizing radiation testing	☐ Heat stress testing
☐ Wipe/bulk sampling (to evaluate worker exposure)	☐ Noise testing	☐ Other

EXPLANATORY NOTES, CLARIFICATIONS:

Date filed: _____
Prepared by: _____
Client representative: _____
Copies to: _____
_____
_____
_____

Journey Management Plan		
Field Team Members		
Name	**Contact Number**	**Organization/Firm**
Work Location (provide map, if needed):		
Work Activities:		
Estimated start time:		
Estimated finish time:		
NOTE: Check in with client representative at the end of each word day. Also, if the work day goes longer than estimated work time listed above, check in with client representative at the listed estimated finish time to give updated finish time.		
At completion of work or in case of emergency contact		

PART E – APPROVALS, ACKNOWLEDGEMENTS

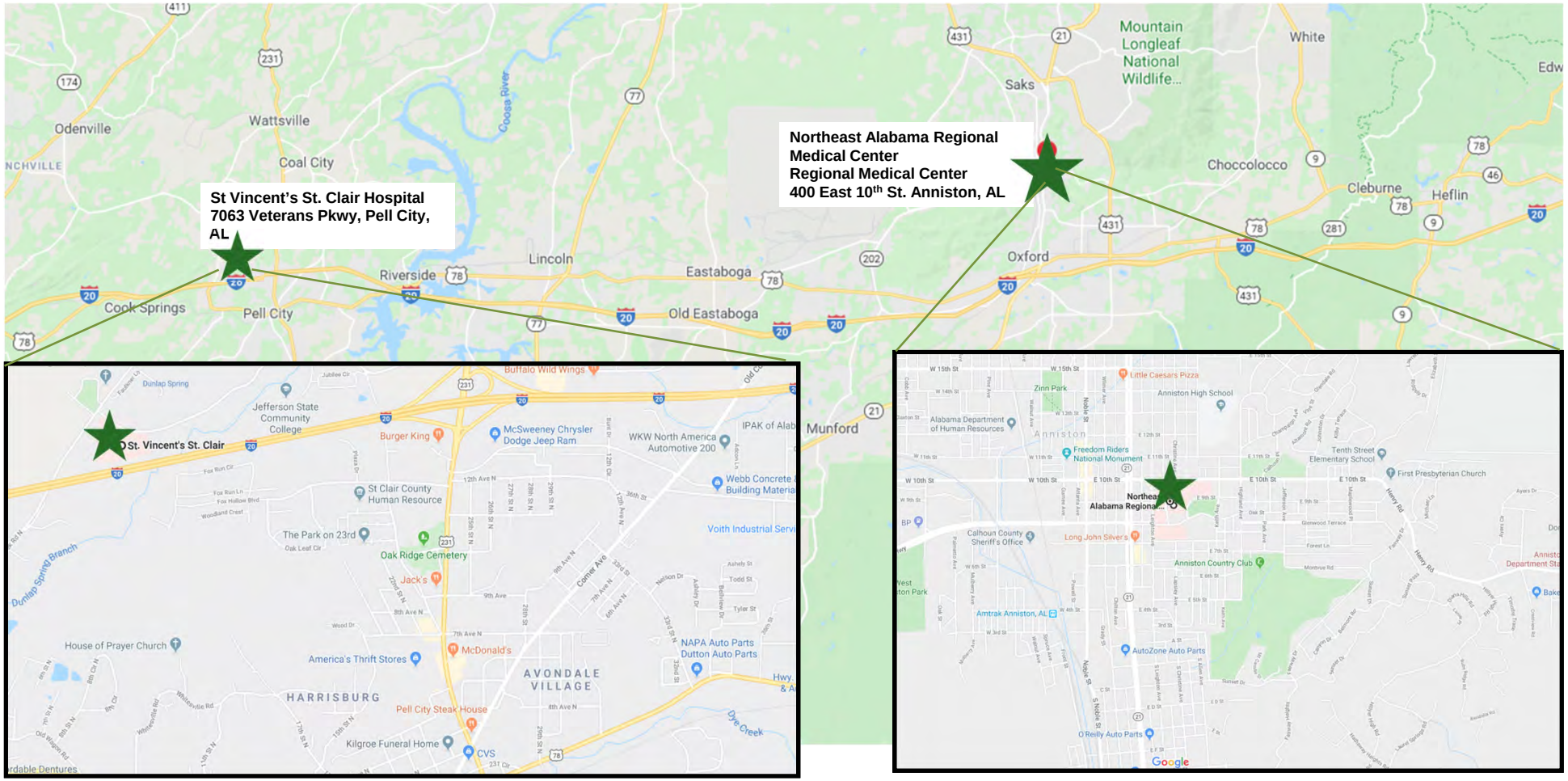
E.1. JSA PREPARATION, REVIEW/APPROVAL SIGNATURES - JSA typically prepared by project staff, reviewed/approved by Project Manager, supervisor, qualified/knowledgeable designee, with support of HS personnel.

	Printed Name	Signature	Date
JSA PREPARED BY: (minimum one person)			
JSA REVIEWED/ APPROVED BY: (minimum one person)	Printed Name	Signature	Date

E.2. FIELD CREW ACKNOWLEDGEMENTS

FIELD CREW
Please sign below to acknowledge you reviewed and understand this JSA, participated in project safety briefing and had an opportunity to ask questions about the information herein.

Printed Name	Signature	Company/Organization	Date



Directions to St. Vincent's

From the East: Take I-20 W to exit 158, US -231 N/Martin Street N in Pell City. Take Hazelwood Drive and Veterans Parkway to St. Vincent's St. Clair.

Direction to Northeast Alabama Regional Medical Center

From the West: Take Highway 202 East. Pass through the intersection with Quintard Avenue, Highway 202 becomes 9th Street. The Regional Medical Center is 1.5 blocks ahead on the left.

From the South: Take Quintard Avenue North to 9th Street. Turn right on 9th Street. The Regional Medical Center is 1.5 blocks ahead on the left.

Anniston PCB Site
Anniston, Alabama
Site-Wide Health and Safety Plan

Medical Center Locations

Solutia

JSA
Attachment 1

JSA Attachment 2: Utility Checklist

Underground/Overhead Utility Checklist	
Project Name:	**Date:**
	Location:
Prepared By:	**Site Safety Officer:**
This checklist must be completed for any intrusive subsurface work such as excavation or drilling. It documents that overhead and underground utilities in the work area are identified and located. The Site Safety Officer shall request utility markouts before the start of field operations to allow the client and utility companies sufficient time to provide them. If complete information is not available, a geophysical or other survey shall be performed to locate obstacles prior to intrusive subsurface activities.	
Procedure: A diagram of the work area depicting the proposed location of intrusive subsurface work sites (i.e., boring locations, excavation locations) must be attached to this form. The diagram must clearly indicate the areas checked for underground structures / utilities, and overhead power lines. This form and the diagram must be signed by the Site Safety Officer and the Project Manager.	

Type of Structure	**Present**	**Not Present**	**Method of Markout**
Electric Power Line			
Natural Gas Line			
Telephone Line			
Water Line			
Product Line			
Sewer Line			
Steam Line			
Drain Line			
Underground Tank			
Underground Cable			
Overhead Power Line			
Overhead Product Line			
Other (Specify)			

Reviewed By		
Name	Job Title	Date

Safety Meeting Log

Anniston PCB Site, Anniston, Alabama

Project:	**Location:**
Date/Time:	**Activity:**
1. Work Summary	
2. Physical Chemical Hazards	
3. Protective Equipment/Procedures	
4. Emergency Procedures	
Is there anyone with any medical condition that they would like to the team to know about? (e.g., Medic Alert, allergy to bee stings, nitro for chest pains)	
Location of medical equipment: Fire extinguishers, first aid kit, route to hospital, auto-injectors, etc.	
5. Signatures of Attendees	

Safe Work Observation Form
Anniston PCB Site, Anniston, Alabama

Observer Name:	**Observer Title:**	**Project:**
Date_____ Time_____ □ AM □ PM	**Project Type/Task Observed**	

Background Information

List Critical Work Procedures

List Issue/Items Requiring Corrective Action

Root Cause Analysis

1. Employee lacks the skill or knowledge to carry out duties.
2. Procedures, work standards, or expectations were not communicated.
3. Procedures or work standards were not developed or were inadequate.
4. Equipment, systems, or tools were inadequate.
5. Employee chose not to take the time or put forth the effort to do the job properly.
6. Supervisor did not require the employee to follow the standard procedure.
7. Employee doesn't see any advantage to doing the job to standard.
8 Uncontrollable

Criterion #	**RCA #**	**Corrective Action Identified**	**Responsible Individual**	**Due Date**	**Closure Date**

Results of Corrective Action

Reviewed by:	Date:	Reviewed by:	Date

Safe Work Observation Form
Anniston PCB Site, Anniston, Alabama

	Environmental Operations	Correct	Questionable	Comments
	TASK PREPARATION			
1.	Health and Safety Plan/MSDS on-site			
2.	Employee familiar/trained on task			
3.	OSHA-required training/medical surveillance			
4.	Utility mark out/check performed			
5.	Traffic hazard addressed/work area marked			
6.	Walking/working surfaces free of hazards			
7.	Tailgate safety meeting conducted			
8.	Impact on nearby residence/business evaluated			
9.	Communicates intentions to other personnel			
10.	Knowledge of emergency procedures			
11.	Distance between equipment and power lines			
12.	Personal protective equipment			
13.	Air monitoring equipment on-site, calibrated			
14.	First aid kit/fire extinguisher on-site			
15.	One person trained in first aid/CPR			
16.	Work zones established and marked			
	PERFORMING TASK			
17.	Employee trained in task to be performed			
18.	Correct body positioning			
19.	Proper lifting/pushing/pulling techniques			
20.	Keep hands/body away from pinch points			
21.	Walking/working surfaces kept clear of debris			
22.	Faces traffic as appropriate			
23.	Vehicles/barricades to protect against traffic			
24.	Drill rig located properly, blocked/chocked			
25.	Drill rig moved only with derrick lowered			
26.	Excavator located on stable ground			
27.	Eye contact made with equipment operator			
28.	Spoil at least 2 ft back from edge of excavation			
29.	Excavation shored/sloped/benched			
30.	Excavation entry controlled			
31.	Equipment/tools used properly			
32.	Electrical equipment connected through GFCI			
33.	Power tools handled properly			
34.	Electrical cords inspected/in good condition			
35.	Follows lockout/tagout procedures			
36.	Air monitoring conducted/action levels understood			
37.	Equipment decontaminated properly			
38.	Personnel decon prior to eating/drinking/smoking			
39.	Decontamination effective			
	AFTER TASK			
40.	Procedures/AHA adequate			
41.	Equipment/tools stored properly			
42.	Proper storage of soil/water/waste material			
43.	Work area secured			
44.	Other			

Incident/Near-Miss Investigation Report
Anniston PCB Site, Anniston, Alabama

Anniston PCB Site, Anniston Alabama			
□ OSHA Recordable □ Lost Workday Injury □ Restricted Duty Injury	□ First Aid Injury □ Vehicle Accident □ Equipment Damage	□ Fire □ Spill/Leak □ Near Miss	Date of Incident:
Every employee injury, accident, and near miss must be reported within 24 hours of the injury. If the incident results in hospitalization, an immediate report must be made by telephone to the Project Manager and the Site Safety Officer			
Project Information			
Project Name			
Location of Incident			
Employee Information			
Name:			
Employment status □ full time □ part time		How long in present job?	
Injury or Illness Information			
Where did the incident/near miss occur? (number, street, city, state, ZIP):			
Employee's specific activity at the time of the incident/near miss:			
Equipment, materials, or chemicals the employee was using when the incident/near miss occurred (e.g., the equipment employee struck against or that struck the employee; the vapor inhaled or material swallowed; what the employee was lifting, pulling, etc.):			
Describe the specific injury or illness (e.g., cut, strain, fracture):			
Body part(s) affected (e.g., back, left wrist, right eye)			
Name and address of treatment provider (e.g., physician, clinic)			Phone:
If hospitalized, name and address of hospital:			Phone:
Date of injury or onset of illness: / /		Time of event or exposure: □ AM □ PM	
Did employee miss at least one full shift of work? □ No □ Yes, 1st date absent / /			
Has employee returned to work? □ No □ Yes If yes, date returned / / □ Regular work □ Restricted work			
To whom reported:		Other workers injured/made ill in this event? □ Yes □ No	
Description of Incident/Near Miss: (described what happened and how it happened)			

Incident/Near-Miss Investigation Report
Anniston PCB Site, Anniston, Alabama

Motor Vehicle Accident (MVA)			Company vehicle? ☐ Yes ☐ No
Accident Location (Street, City, State)			
Vehicle Towed ☐ Yes ☐ No	Other Vehicle? ☐ Yes ☐ No	# Vehicles Towed	# of Injuries

Spill		
Material Spilled:	Quantity:	Source:
Agency Notifications:		
Cost of Incident $		

Third-Party Incidents		
Name of Owner:	Address:	Phone:
Description of Damage:		
Witness Name:	Address:	Phone:
Witness Name:	Address:	Phone:

Root Cause and Contributing Factors: Conclusion (Describe in Detail Why Incident/Near Miss Occurred	
1	
2	
3	
4	
5	

Root Cause(s) Analysis (RCA):

1. Lack of skill or knowledge	5. Correct way takes more time and/or requires more effort
2. Lack of or inadequate operational procedures or work standards	6. Short-cutting standard procedures is positively reinforced or tolerated
3. Inadequate communication of expectations regarding procedures or work standards	7. Person thinks there is no personal benefit to always doing the job according to standards
4. Inadequate tools or equipment	8. Uncontrollable.

#	RCA #	Solutions(s): How to Prevent Incident/Near Miss from Reoccurring	Person Responsible	Due Date	Closure Date

Investigation Team Members		
Name:	Job Title:	Date:
Name:	Job Title:	Date:
Name:	Job Title:	Date:

Incident/Near-Miss Investigation Report
Anniston PCB Site, Anniston, Alabama

Results of Solution Verification and Validation		
Reviewed by		
Name:	Job Title:	Date:
Name:	Job Title:	Date:
Name:	Job Title:	Date

Heat Stress Exposure Monitoring Form
Anniston PCB Site, Anniston, Alabama

DATE: ________________
MONITOR: ____
EMPLOYEE'S NAME: ___________________________________
WORK ACTIVITY: ______________________________________

Time	Oral/Ear Canal Temperature	Pulse (BPM)	Comments

DATE: ______________
MONITOR: ____
EMPLOYEE'S NAME: ___________________________________
WORK ACTIVITY: ______________________________________

Time	Oral/Ear Canal Temperature	Pulse (BPM)	Comments

DATE: _____________
MONITOR: ____
EMPLOYEE'S NAME: ____________________________________
WORK ACTIVITY: _______________________________________

Time	Oral/Ear Canal Temperature	Pulse (BPM)	Comments

First Aid Kit Contents
Anniston PCB Site, Anniston, Alabama

List of minimum required first aid kit equipment per ANSI Z308.1-2009

ANSI/ISEA Z308.1-2009 Type I, II, III, or IV			
Required Minimum Fill		**Recommended Supplies**	
	1 First Aid Guide		Analgesic (oral)
	1 Absorbent Compress 4 x 8 in. minimum		Bandage Compress 2 x 36 in. minimum
	16 Adhesive Bandages 1 x 3 in.		Breathing Barrier, single use
	1 Adhesive Tape 2.5 yd.		Burn Dressing 12 sq. in. minimum
	10 Antiseptic Treatment Applications 0.5 gm each		Cold Pack 4 x 5 in. minimum
	6 Burn Treatment Applications 0.9 gm. each		Eye Covering ¼ in. thick minimum
	4 Sterile Pads 3 x 3 in. minimum		Eye/Face Wash, Sterile 4 fl. oz. minimum
	2 Pair Medical Exam Gloves		Roller Bandage 2 in. x 4 yd. minimum
	1 Triangular Bandage 40 x 40 x 56 in. minimum		Hand Sanitizer, 0.9 gm. minimum
	6 Antibiotic Treatment Applications 0.5 gm. each		Tweezers
			Surgical Scissors
			Bloodborne Pathogens Exposure Prevention Kit
The described kit may be suitable for some businesses. However, the adequacy of the contents for hazards of each work environment should always be evaluated by competent personnel. For a variety of operations, employers may find that additional first aid supplies and kits are needed.			

This kit meets ANSI Z308.1-2009 only when the minimum is maintained with first aid products marked “ANSI Z308.1-2009.”

Underground/Overhead Utility Checklist
Anniston PCB Site, Anniston, Alabama

Underground/Overhead Utility Checklist	
Project Name:	**Date:**
	Location:
Prepared By:	**Site Safety Officer:**

This checklist must be completed for any intrusive subsurface work such as excavation or drilling. It documents that overhead and underground utilities in the work area are identified and located. The Site Safety Officer shall request utility markouts before the start of field operations to allow the client and utility companies sufficient time to provide them. If complete information is not available, a geophysical or other survey shall be performed to locate obstacles prior to intrusive subsurface activities.

Procedure: A diagram of the work area depicting the proposed location of intrusive subsurface work sites (i.e., boring locations, excavation locations) must be attached to this form. The diagram must clearly indicate the areas checked for underground structures / utilities, and overhead power lines. This form and the diagram must be signed by the Site Safety Officer and the Project Manager.

Type of Structure	Present	Not Present	Method of Markout
Electric Power Line			
Natural Gas Line			
Telephone Line			
Water Line			
Product Line			
Sewer Line			
Steam Line			
Drain Line			
Underground Tank			
Underground Cable			
Overhead Power Line			
Overhead Product Line			
Other (Specify)			

Reviewed By		
Name	Job Title	Date

Site-Specific Respiratory Protection Program
Anniston PCB Site, Anniston, Alabama

Selection of Respiratory Protection

This form or equivalent will be used to document the personnel and equipment used for the Respiratory Protection Program (RPP). All respiratory protection used by personnel must be selected according to 29 CFR 1910.134. The implementation of this program will be under the direct supervision of **Insert Name of local RPP coordinator and Competent Person**. To simplify this procedure for field implementation, the following action levels have been determined for this project:

Specific Equipment	Action Level/Monitoring	Activity/Location

Use of Respiratory Protection

Based on the site-specific chemical hazards and the anticipated site activities, the following respiratory protection is anticipated to be used.

Activity/Location	Respiratory Protection Anticipate

Based on the actual and anticipated site-specific conditions, the following cartridge change-out schedule has been calculated when using air-purifying respirators:

Cartridge/Canister (make and model)	Activity/Location	Change-Out Frequency

The change-out frequency table above was determined by **insert name of Competent Person** and the calculations can be reviewed at (insert location).

All personnel on-site must be properly fit-tested for each type of equipment they may be required to use. The personnel qualified to perform this testing are **insert name of qualified fit tester(s**).

Site-Specific Respiratory Protection Program
Anniston PCB Site, Anniston, Alabama

The records of all fit tests for site personnel are maintained and can be reviewed at **insert location**.

Training records for respiratory protection may be reviewed at **insert location**.

The following respiratory protective equipment has been assigned to specific individuals:

Employee Name	Equipment Type/Number	Size

Medical clearance records for users of respiratory protection can be reviewed at **insert location**.

A copy of all operating instructions for each type of equipment may be reviewed at **insert location**.

A respirator-cleaning station has been set up at **insert location(s).** This station includes the following items to assist in the cleaning process:

Equipment Included

The following instructions will be posted at the respirator cleaning station to ensure adequate cleaning and disinfection:

Respirator Type	Step-by-Step Cleaning Instructions

Site-Specific Respiratory Protection Program
Anniston PCB Site, Anniston, Alabama

Respirator Inspection

In addition to inspecting ALL respiratory protective equipment prior to use, these additional inspections will be conducted and documented:

Equipment	Frequency	Responsible Party

Respirator Storage

All respiratory protection used by personnel must be stored in a convenient, clean, and sanitary location and according to specific manufacturer recommendations. Special attention must be paid to protecting respiratory protection from dusty conditions, temperature extremes, and potential contamination during storage.

The following storage procedures will be used for equipment used on a routine basis (i.e., storage during nonuse periods of a work shift or storage between work shifts):

Equipment	Storage Procedures

All equipment not routinely used will be stored according to the procedures outlined below:

Equipment	Storage Procedures/Location

Any equipment not assigned to specific site personnel will be stored under the supervision of (insert name) following the procedures outlined below:

Equipment	Storage Procedures/Location

Site-Specific Respiratory Protection Program
Anniston PCB Site, Anniston, Alabama

Surveillance of Work Area

Appropriate monitoring of the work area conditions shall be performed to establish the degree of employee exposure or stress. In order to simplify this surveillance, the following procedures have been determined for this project:

Monitoring Equipment Used	Frequency of Surveillance	Personnel/Area Monitored

Records of the above surveillance will be documented in accordance with recordkeeping procedures.

Program Evaluation

There will be regular inspections and evaluations (at least monthly) to determine the continued effectiveness of this program. Documentation will be maintained by **insert name,** and can be reviewed at **insert location**.

This RPP will be reviewed and updated whenever deficiencies are noted during monthly inspections or annually, whichever is more frequent.

Approvals

Project Manager:	**Date:**
Site RPP Coordinator:	**Date:**
SSO:	**Date:**

Qualitative Respirator Fit Test
Anniston PCB Site, Anniston, Alabama

Name:			
Org. No.:		Home Office:	
Tester Inspection of Respirator:		□ Passed	□ Failed
Comments:			
Method:	□ Irritant Smoke	□ Other:	
Sensitivity Check before Donning Respirator:		□ Passed	□ Failed
Respirator Manufacturer:		**Size:**	**Model:**
Is Respirator Comfortable?		□ Yes	□ No
If No, Explain:			
Does employee wear glasses or contacts?			
Have inserts been provided?	□ Yes	□ No	□ N/A
Are inserts worn during this test?	□ Yes	□ No	□ N/A
Face Seal Checks:			
□ Visual	□ Negative Pressure	□ Positive Pressure	
Fit Test Procedure (perform each for 1 minute)			
□ Pos/Neg Leak Check Nod Head			
□ Breathe Normally Talking (read the Rainbow Passage)			
□ Breathe Deeply Bend Over			
□ Turn Head Breathe Normally			
Sensitivity Check after Doffing Respirator:		□ Passed	□ Failed
Rainbow Passage:			
When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow.			
Test Given By:		Date:	
Signature:			

Accepted Fit Testing Procedures (Mandatory)
Anniston PCB Site, Anniston, Alabama

Qualitative fit testing will be conducted using the following procedures:

1. The most acceptable respirator will be chosen to correctly fit the user and provide an acceptable comfort level.
2. Provide instructions to employee on donning respirator, positioning, strap tension, and acceptable fit. A mirror should be available to assist in donning a respirator. The employee should assess the respirator for comfort and fit. This instruction does not constitute formal training on respirator use.
3. If the employee is not familiar with using a respirator, they will be directed to don the mask several times and adjust the straps each time to become adept at setting proper tension on the straps.
4. The following criteria shall be used to help determine the adequacy of the respirator fit: Chin placement; strap tension; fit across nose bridge; respirator of proper size to span distance from nose to chin; tendency of respirator to slip; self-observation in mirror to evaluate fit and respirator position.
5. Conduct a user seal check, both negative and positive pressure seal checks. Before conducting the negative and positive pressure checks, the employee will seat the mask on the face by moving the head from side-to-side and up and down slowly while taking in a few slow deep breaths. If pressure checks are failed, reposition the mask to attain a better fit. If mask continually fails, another respirator may need to be selected.
6. The fit test will not be conducted if facial hair is present; the employee must be clean-shaven.
7. Medical clearance to wear a respirator must be conducted prior to fit testing an employee.
8. Prior to the fit test, the employee will be given a description of the fit test and their responsibilities during the test. The description shall include examples of the test exercises that the employee will be performing. The respirator to be tested shall be worn for at least 5 minutes before the start of the fit test.
9. The fit test shall be performed while the test subject is wearing any applicable safety equipment that may be worn during actual respirator use that could interfere with respirator fit.
10. Test Exercises. The following exercises will be conducted standing in place during the fit test, except (G).
    a. Normal breathing: Without talking, breathe normally.
    b. Deep breathing: Breathe slowly and deeply, taking caution so as not to hyperventilate.
    c. Turning head side to side: Turn head from side to side. Hold the head at each side, inhaling at each side.
    d. Nod head up and down: Move head up and down. Inhale and exhale in both the up and down positions.
    e. Talking: Talk slowly and to be heard by the test conductor. Read from a prepared text such as the rainbow passage, ABCs, or recite a memorized poem or song (see Qualitative Respiratory Fit Test Form for text of the “Rainbow Passage”).
    f. Grimace: Grimace by smiling or frowning.
    g. Body Movement: Bend over to touch toes, or jog in place.
    h. Normal breathing: Without talking, breathe normally.

Each test exercise shall be performed for one minute except for the grimace exercise, which shall be performed for 15 seconds. The employee will be questioned by the test conductor regarding the comfort of the respirator upon completion of the fit test. If it has become unacceptable, another model of respirator can be tried. The respirator cannot be adjusted once the fit test exercises begin. Any adjustment voids the test, and the fit test must be repeated.

SCBA Check Form
Anniston PCB Site, Anniston, Alabama

Month	Unit No.	Inspector's Initials	Pass/ Fail	Corrective Action(s) Needed	Date(s) Corrected

The following shall be checked on each SCBA during each monthly inspection:

1. Check the overall shape of each facepiece to ensure it has not been misshapen.
2. Check the respirator straps to ensure they maintain their elasticity, and that the clips are operational.
3. Remove the cover of the exhalation valve (if possible), and make sure the valve rests properly and is not dirty or cracked/bent.
4. Check all hoses for kinks and holes.
5. Check the facepiece to ensure that the lens is not scratched or clouded to prevent proper vision during wearing.
6. Check straps of the harness to ensure they are not cracked or rotted.
7. Turn on airflow and check to ensure that the bottle is full and that air is flowing.
8. Turn off air and verify that the low-air alarm is operational.

Comments:

Qualitative Respirator Fit Test
Anniston PCB Site, Anniston, Alabama

Name:			
Org. No.:		Home Office:	
Tester Inspection of Respirator:		□ Passed	□ Failed
Comments:			
Method:	□ Irritant Smoke	□ Other:	
Sensitivity Check before Donning Respirator:		□ Passed	□ Failed
Respirator Manufacturer:		**Size:**	**Model:**
Is Respirator Comfortable?		□ Yes	□ No
If No, Explain:			
Does employee wear glasses or contacts?			
Have inserts been provided?	□ Yes	□ No	□ N/A
Are inserts worn during this test?	□ Yes	□ No	□ N/A
Face Seal Checks:			
□ Visual	□ Negative Pressure	□ Positive Pressure	
Fit Test Procedure (perform each for 1 minute)			
□ Pos/Neg Leak Check Nod Head			
□ Breathe Normally Talking (read the Rainbow Passage)			
□ Breathe Deeply Bend Over			
□ Turn Head Breathe Normally			
Sensitivity Check after Doffing Respirator:		□ Passed	□ Failed
Rainbow Passage:			
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Test Given By:		Date:	
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    c. Turning head side to side: Turn head from side to side. Hold the head at each side, inhaling at each side.
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    e. Talking: Talk slowly and to be heard by the test conductor. Read from a prepared text such as the rainbow passage, ABCs, or recite a memorized poem or song (see Qualitative Respiratory Fit Test Form for text of the “Rainbow Passage”).
    f. Grimace: Grimace by smiling or frowning.
    g. Body Movement: Bend over to touch toes, or jog in place.
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SCBA Check Form
Anniston PCB Site, Anniston, Alabama

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3. Remove the cover of the exhalation valve (if possible), and make sure the valve rests properly and is not dirty or cracked/bent.
4. Check all hoses for kinks and holes.
5. Check the facepiece to ensure that the lens is not scratched or clouded to prevent proper vision during wearing.
6. Check straps of the harness to ensure they are not cracked or rotted.
7. Turn on airflow and check to ensure that the bottle is full and that air is flowing.
8. Turn off air and verify that the low-air alarm is operational.

Comments:

Real-Time Air Monitoring Log
Anniston PCB Site, Anniston, Alabama

Date:	**Calibration/Bump Test Date:**	**Operational Period:**	**Monitored by:**	
Site Name/Location:	**Chemicals of Concern:**	**Action Levels:**	**Weather:** Temperature: Relative Humidity: Wind: Cloud Cover: Precipitation:	
Instrument, ID Number	**Location/Activity**	**Results (ppm, mg/m^3)**	**Time**	**Interferences and Comments**

Site-Specific Hearing Conservation Program
Anniston PCB Site, Anniston, Alabama

As per 29 CFR 1910.95, noise monitoring will be conducted by

_____

Such monitoring will consist of (check those that apply):

_____ Sound level meter surveying

_____ Noise dosimetry

Specific instrumentation to be used is (make/model):

Make	Model

and will be calibrated at a frequency of_____and documented in the _____.

Monitoring strategy is as follows: (List all equipment and activities on site which may involve sound levels above 80 dBA and an explanation of the strategy to document actual exposures.)

Area/Equipment	Monitoring Strategy

Monitoring frequency will be as stated above and when the following changes in site conditions/activities occur:

1.
2.
3.
4.
5.

Site-Specific Hearing Conservation Program
Anniston PCB Site, Anniston, Alabama

Employee Notification

All site employees exposed above the OSHA action level (85 dBA – 8-hour TWA) will be notified of the monitoring results by _____(Name/Title) at an interval not to exceed _____after completion of monitoring.

Notification shall be written with copy to the Corporate Safety Officer. Documentation of employee notifications and corresponding signatures of notified employees will be kept in the health and safety logbook/files.

Observation of Monitoring

Employees affected by the monitoring be given the opportunity to observe noise monitoring procedures. This will be achieved by:

_____

_____

_____

_____

Audiometric Testing Program and Requirements

Personnel who perform field activities where noise exposure above action levels is expected are required to participate in an audiometric testing program that meets the requirements of OSHA 29 CFR 1910.95. Additionally, any subcontractors performing work where noise levels may exceed action level will be required to provide documentation that they participate in an audiometric testing program which meets the requirements of 29 CFR 1910.95. Documentation of participation in the testing program will be maintained by_____and will be located at_____.

Hearing Protectors and Estimating Attenuation

A selection of suitable hearing protectors will be made available to employees who might have 8-hour TWA noise exposures above 85 dBA. The types anticipated to be available include:

Protection Type	Attenuation

Hearing protector attenuation will be evaluated by_____for specific noise environments according to the following method prior to determining their suitability foruse:

1.
2.
3.
4.
5.

Site-Specific Hearing Conservation Program
Anniston PCB Site, Anniston, Alabama

The following site personnel will be required to wear hearing protectors during specific activities as determined in accordance with 29 CFR 1910.95 and the results of site-specific monitoring conducted according to Section 1.0 of this program. (This section can be completed after monitoring, if necessary.)

Employee Name	Activity Type	Type of Protection

Hearing protectors will be properly fitted by _____ upon initial distribution to site workers. Size and type of protector for each employee fitted will be recorded in the project files.

Training in the use and care of hearing protectors shall be conducted by _____ during appropriate task specific meetings or training.

Hearing protectors will be distributed by _____ from the storage location at the _____.

Access to Information and Training Materials

All information required by 29 CFR 1910.95 to be made available to the employees will be posted by (Name/Title) at the _____.

OSHA standard 29 CFR 1910.95 will also be kept on-site.

Recordkeeping

Records required by 29 CFR 1910.95 shall be completed by _____ and maintained at the _____ and placed on permanent file at the _____, for the minimum duration required by the standard.

Employees will be permitted access to their individual records.

Approvals

Project Manager: _____ Date: _____

SSO: _____ Date: _____

Health and Safety Inspection Form
Anniston PCB Site, Anniston, Alabama

Health and Safety Inspection Form for Anniston PCB Site, Anniston Alabama				
Project Name:		Date:		
		Location:		
Prepared by:		Site Safety Officer:		
Auditor:				
	Yes	**No**	**N/A**	**Comments**
General				
Is the HASP on-site?				
Is the HASP finalized and approved?				
Is the OSHA poster displayed?				
Are emergency telephone numbers posted?				
Is emergency eyewash immediately available?				
Is an emergency shower immediately available?				
Are emergency notification means available (radio, telephone)?				
Is a first aid kit immediately available?				
Is the first aid kit adequately stocked?				
Is there a proper sanitation facility on-site/				
Documentation and Recordkeeping				
Have all personnel signed a HASP acknowledgment form?				
Are all personnel properly trained? Documentation available?				
Is the daily field log kept by the SSO?				
Are levels of PPE recorded?				
Are contaminant levels recorded?				
Are site surveillance records kept by SSO?				
Is a copy of current fit test records on-site?				
Are calibration records maintained for air monitoring equipment?				
Are incident/near miss forms on-site?				
Are field team review sheets signed?				
Are additional hospital route directions available?				
Is the visitor logbook being accurately maintained?				
Are SDSs available for chemicals on-site?				
Are JSAs recorded?				
Is the first aid kit inspected weekly?				
Are daily safety meetings held?				
Are emergency procedures discussed during safety meetings?				

Health and Safety Inspection Form
Anniston PCB Site, Anniston, Alabama

Health and Safety Inspection Form for Anniston PCB Site, Anniston Alabama				
	Yes	**No**	**N/A**	**Comments**
Emergency Responses				
Is a vehicle available on-site for transportation to the hospital?				
Are fire extinguishers on-site and immediately available at designated work areas?				
Is at least one person trained in CPR and first aid on-site during work activities?				
Do all personnel know who is trained in CPR/first aid?				
Personal Protective Equipment (PPE)				
Is proper PPE being worn as specified in JSA?				
Level of PPE being worn				
Is PPE adequate for work conditions?				
If not, give reason				
Upgrade/downgrade to PPE level				
Does any employee have facial hair that would interfere with respirator fit?				
If yes, are they willing to shave, as necessary?				
Fit tested within the last year? (documentation present)				
If Level B is a back-up/emergency person suited up (except for air)?				
Does the SSO periodically inspect PPE and equipment?				
Is PPE stored properly?				
Is all equipment required in the JSA on-site?				
Properly calibrated?				
In good condition?				
Used properly?				
Other equipment needed?				
List				
Is monitoring equipment covered with plastic to minimize contamination?				
Personnel and Equipment Decontamination				
Is the decontamination area properly designated?				
Is appropriate cleaning fluid used for known or suspected contaminants?				
Are appropriate decontamination procedures used?				
Are decontamination personnel wearing proper PPE?				
Is the equipment decontaminated				
Are sample containers decontaminated?				
Are disposable items replaced as required?				

Health and Safety Inspection Form
Anniston PCB Site, Anniston, Alabama

Health and Safety Inspection Form for Anniston PCB Site, Anniston Alabama				
Work Practices				
	Yes	**No**	**N/A**	**Comments**
Was proper collection and disposal of decontamination fluid performed?				
Is water available for decontamination?				
Is the buddy system being used?				
Is equipment kept off drums and the ground?				
Is kneeling or sitting on drums or the ground prohibited?				
Do personnel avoid standing or walking through puddles or stained soil?				
Are work zones established?				
If night work is conducted, is there adequate illumination?				
Is smoking, eating, or drinking in the EZ or CRZ prohibited?				
To the extent feasible, are contaminated materials handled remotely?				
Are contact lenses prohibited on-site?				
Is the entry into excavations prohibited unless properly shored or sloped?				
Is a competent person on-site during excavation?				
Are all unusual situation on-site listed in JSAs?				
If not, when?				
Action taken?				
JSA updated?				
Confined Space Entry				
Are personnel trained according to 1910.146-Confined Space Entry?				
Are all confined spaces identified? If not, list.				
Is all appropriate equipment available and in good working order?				
Is equipment properly calibrated?				
Are confined space permits used?				
Are confined space permits completely and correctly filled out?				

ATTACHMENT B

HEALTH AND SAFETY PROCEDURES

HS 118 Confined Space Entry Program

HS 118 CONFINED SPACE ENTRY PROGRAM

1.0 PURPOSE

This procedure provides guidelines regarding confined space entry. Personnel will not enter any confined space until it has been evaluated, classified, and (if necessary) has had a specific entry procedure developed. Personnel performing such entries will meet the training and program requirements specified below and in 29CFR1910.146. This procedure applies to all site confined space entry projects.

2.0 DEFINITIONS

Confined Space: A space that

- is large enough and so configured that an employee can physically enter and perform assigned work; and
- has limited or restricted means for entry or exit; and
- is not designed for continuous human occupancy.

There are two types of confined spaces:

1. **Permit-Required Confined Space (PRCS) –** a confined space that exhibits one or more of the following properties:
    a. Contains or has a potential to contain a hazardous atmosphere
    b. Contains a material that has the potential for engulfing an entrant
    c. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross section
    d. Contains any other recognized serious safety or health hazard
2. **Non-Permit-Required Confined Spaces (NPRCS) -** Spaces that do not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm. These spaces do not require specific entry procedures.

Only a Certified Industrial Hygienist, Certified Safety Professional, Corporate Safety Manager or designee, or Professional Engineer can designate a NPRCS after reviewing the space(s), historical monitoring data, and other factors (e.g., injuries that have occurred). Therefore, all confined spaces will be considered PRCS unless specifically designated as a NPRCS, in writing, on the approved confined space inventory listing.

Entry: The action by which a person passes through an opening into a confined space. Entry is considered to have occurred as soon as any part of the body breaks the opening of a confined space.

3.0 CLASSIFICATION OF CONFINED SPACES

3.1 Identification of Confined Spaces

All confined spaces that may be entered will be identified, evaluated and classified on a Confined Space Inventory Listing (**Attachment 1** or equivalent). The inventory listing shall be updated as required, at a minimum annually.

3.2 Labeling

1. All PRCSs will be labeled so that personnel are adequately warned of the potential for hazardous conditions/atmospheres. Labeling is not required under the following circumstances:
    a. The spaces are easily recognizable, numerous, and widely spaced (e.g., storm sewer manholes). Personnel will be instructed that these constitute confined spaces during required training. However, these locations will be included on the inventory.
    b. A complete inventory has been developed, all personnel have been trained in the use of the inventory, and they consult the inventory prior to performance of any work that may require entry into a confined space.
2. When NPRCSs require the implementation of confined space entry procedures because of specific work operations (e.g., painting, welding), all entry points will be labeled to alert all personnel of the existence of the hazardous conditions. These signs will be removed only when the hazard no longer exists (e.g., complete curing of the paint).

3.3 Classification of Confined Spaces

For each identified confined space, an evaluation to determine the nature and extent of all possible hazards to entrants must be conducted. Consideration will be given to the following types of hazards:

- The presence of possible airborne contaminants at concentrations exceeding established occupational exposure limits
- The presence of any physical hazards (e.g., electrical shock, mechanical injury)
- The presence of flammable or explosive conditions
- The presence of any potential for rapid flooding or engulfment
- Configurations/positioning that may cause an entrant to become trapped
- Initial classification as either a PRCS or NPRCS

The evaluation will be documented using the *Confined Space Hazard Assessment* form found in **Attachment 2.**

Wherever the confined space is controlled by a client or third-party, the controlling entity should be contacted to provide the information necessary to complete the evaluation.

4.0 CONFINED SPACE ENTRY DUTIES

4.1 Entry Supervisor

3. Understand the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
4. Verify following before signing the permit and allowing entry to begin:
    a. Appropriate entries have been made on the entry permit.
    b. All tests specified by the permit have been conducted.
    c. All procedures and equipment specified by the permit are in place.
    d. Means of communication are available and have been tested.
5. Terminate the entry and cancel the permit when entry operations are complete or when a prohibited condition arises.
6. Verify rescue services (when required) are available and the means for summoning them are operable.
7. Remove unauthorized individuals who enter or who attempt to enter the permit space during entry operations.
8. Ensure that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.
9. Withdraw the entry permit and stop all entries if unsafe conditions are reported during any confined space entry. The entry supervisor will not permit same or any other entry until cause of unsafe conditions is thoroughly investigated and the Confined Space Program is reviewed to prevent reoccurrence.

4.2 Attendant

1. Understand the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
2. Be aware of the possible behavioral effects of hazard exposure in the authorized entrants.
3. Maintain an accurate count of authorized entrants in the permit space and ensure the means used to identify authorized entrants accurately tracks who is in the permit space.
4. Remain outside the permit space during entry procedures until relieved by another authorized attendant.

5. Communicate with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space.
6. Monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space. The attendant will order the authorized entrants to evacuate the permit space under any of the following conditions:
    a. The attendant detects a problem.
    b. The attendant detects the behavioral effect of hazard exposure in an entrant.
    c. The attendant detects a situation outside the space that could endanger the entrant.
    d. If the attendant cannot effectively and safely perform all his/her assigned duties.
7. Summon rescue and other emergency services as soon as the attendant determines that entrants may need assistance to escape from permit space hazards.
8. Take the following actions when unauthorized persons approach or enter a permit space while entry is underway:
    a. Warn the unauthorized persons they must stay away from the permit space.
    b. Advise unauthorized persons they must exit immediately if they have entered the permit space.
    c. Inform the authorized entrants and the entry supervisor if unauthorized entrants have entered the permit space.
9. Perform nonentry rescues as specified within this program.
10. Perform no other duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

4.3 Authorized Entrant

1. Understand the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
2. Properly use personal and facility equipment as required by the entry permit.
3. Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space.
4. Alert the attendant whenever a recognized warning sign or symptom of exposure to a dangerous situation or a prohibited condition exists.
5. Exit from the permit space as quickly as possible whenever
    a. an order to evacuate is given by the attendant or the entry supervisor; when the entrant recognizes any warning sign or symptom of exposure to a dangerous situation;
    b. when the entrant detects a prohibited condition; or

c. when an evacuation alarm is activated.

4.4 Rescue Service

Prior to authorizing entry into any confined space, a rescue team will be identified that will meet the following requirements:

1. A rescuer must be able to respond to a rescue summons in a timely manner (within 3 minutes for life-threatening situations or 15 minutes for non-life-threatening injuries), considering the hazard(s) identified.
2. A rescuer must be equipped for and proficient in performing the needed rescue services;
3. Be informed of the hazards they may confront when called on to perform rescue at the site; and
4. have access and knowledge of all permit spaces from which rescue may be necessary so that the rescue service can develop appropriate rescue plans and practice rescue operations.
5. Have the required personal protective equipment (PPE) and be trained in its use.
6. Be trained to perform assigned rescue duties.
7. Be trained in basic first-aid and cardiopulmonary resuscitation (CPR) (at least one member shall hold a current certification in first aid and CPR).
8. Practice making permit space rescues at least once every 12 months.

4.5 Facilitating Nonentry Rescue

1. Retrieval systems or methods shall be used whenever an authorized entrant enters a permit space (unless the retrieval equipment would increase the overall risk of entry).
2. Retrieval systems shall meet the following requirements:
    a. Each authorized entrant shall use a chest or full body harness with a retrieval line attached at the center of the entrant's back near shoulder level or other suitable locations as appropriate.
    b. The other end of the retrieval line shall be attached to a mechanical device (mandatory for a rescue that is more than 5 feet deep) or fixed point outside the permit space.

4.6 PRCS-Specific Entry Procedures

To protect employees during PRCS entries, and to meet the requirements of 29 CFR 1910.146, PRCS entry procedures will be developed for each PRCS to be entered. Each entry procedure will detail the following:

- The identity of the PRCS(s) to which the procedure applies
- Details concerning the potential hazards associated with the entry operation/PRCS

- Preparation prior to entry:
  - Required air monitoring equipment
  - PPE
  - Required emergency response/extraction equipment
  - Required ventilation procedures (as applicable)
  - Required isolation procedures (as applicable)
  - Rescue agency notification requirements (as applicable)
- Required monitoring procedures prior to entry and applicable at-entry reclassification criteria
- Air monitoring procedures during entry (if reclassification has not occurred)
- PPE requirements during entry (if reclassification has not occurred)

Specific entry procedures can be documented by following the procedures in sections 5.1 through 5.4 of this procedure and by completing a Job Safety Analysis (JSA) in combination with a completed Confined Space Hazard Analysis and Confined Space Permit.

4.7 PRCS Pre-entry Procedure:

Prior to the start of the entry operation the entry supervisor will assign individuals on the entry team to the following jobs:

- Entrant – the person entering the PRCS.
- Primary attendant[1] - the person dedicated only to assisting the entrant, observing the entry operation and maintaining communications with the entrant throughout the entry procedure.
- Secondary attendant for rescue procedures – the person assigned either to specifically support the entry operation or working nearby who can assist with rescue operations in the event of an accident. This person can perform other duties unrelated to observing the entry.

The entry supervisor is responsible for ensuring that the individuals assigned to each job fully understand their duties and responsibilities prior to initiating the entry operation. The entry supervisor will review the complete entry procedure with all team members prior to the work. The entry supervisor will also verify the availability of rescue services.

Additional requirements for pre-entry planning include the following:

- Select the appropriate equipment to measure the potential hazards. Select a multigas meter capable of measuring oxygen, combustible gas (% lower explosive limit [LEL]), and other hazardous gases.

[1] Note: The entry supervisor can serve as the primary or secondary attendant, but cannot perform work as the PRCS entrant.

- Determine the acceptable values for the hazardous conditions being measured, based on the equipment in use and the field calibration method. The action levels are determined as follows:
  - Oxygen 19.5% - 23.5%
  - LEL 10%
  - Hydrogen sulfide 5 parts per million (ppm)
  - Carbon monoxide 15 ppm
  - Other toxic chemicals Contact SSO
- Ensure all the equipment selected is calibrated, and calibration is still valid.

Personnel trained in accordance with this procedure shall perform field verification of equipment as follows:

1. Calibrate combustible gas meters using appropriate span gas for the detectors to be used. (This span gas calibration shall be performed each time the instrument is turned on).
2. Check detector tube pumps for leakage using the manufacturer's procedures.
3. Calibrate photo ionization detectors (PID) using isobutylene, or other material, in accordance with the manufacturer's directions.
4. Calibrate any other instrumentation to be used in accordance with manufacturer's directions.
5. Set up barricades around the space being entered as required. Set up required rescue or retrieval systems.
6. Institute required lockout/tagout procedures (i.e., electrical, steam, liquid flow-pipe blanking)
7. Ensure that a second person (trained as entry attendant) is available and assists in the setup procedures.
8. Agree upon a means of communication between the entrant and the attendant. (The attendant is not authorized to perform rescue involving entry into the space, unless he/she is trained for rescue and another entry attendant replaces him/her prior to the attempt to rescue).
9. Attendant must have a means to contact emergency rescue services for further assistance.
10. Complete Confined Space Entry Permit:
    a. Have the attendant verify the completion of the required actions.
    b. Entry supervisor shall sign the permit upon verification of completed actions.
    c. Maintain the permit at all authorized entry sites until completion of the entry.

5.0 PRCS ENTRY PERMITS

A PRCS entry permit is required to be completed for each individual PRCS entry operation (Exception: Multiple entries of an *individual PRCS* during a single work shift can be covered by a single permit). The permit provides the means for documenting the following:

- The identities and roles of all individuals involved in the entry operation
- Equipment used for performance of the entry (e.g., monitoring instruments, extraction equipment)
- Pre-entry and operational monitoring results
- Other relevant workplace conditions or events related to the entry operation (e.g., vault isolation procedures)

The permit also provides the documented basis for reclassification of any PRCS as NPRCS (for purposes of the particular entry operation) based upon pre-entry monitoring procedures. Each permit will be signed and authorized by the entry supervisor. At the completion of the entry operation, the permit will be filed as part of the project records.

A copy of a *PRCS Entry Permit* form is provided in **Attachment 3** and an example of *Confined Space Entry Classification Guidance* is provided in **Attachment 4**.

5.1 PRCS Entry Procedure

- Don any required PPE.
- Check the area around the seal to ensure that no flammable situations exist prior to door or cover removal. Note: Always check for oxygen levels first if the meter does not measure simultaneously. Low oxygen levels can cause LEL readings to be incorrect.
- Carefully remove any access doors or covers.
- Upon removal of the access cover or door, check the immediate atmosphere using remote testing procedures to ensure the immediate atmosphere is safe. If any of the parameters being tested are outside the action level, do not enter.
- If necessary, use exhaust ventilation to either remove the contaminant(s) or to correct the oxygen-deficient atmosphere.
- If the initial test(s) are within allowable ranges, slowly enter the space, continually testing the atmosphere in front and to the sides.
- In stratified atmospheres (i.e., vertical entries), testing will be done 4 feet in advance of the direction of travel. Travel speed will allow for adequate instrument response time.
- The entire area where work is to be performed will be tested prior to performance of any work.

- While performing the work, place the direct read instruments in a location that will not interfere with the work, allow for continual monitoring, and allow for noting any alarms that may be activated.
- Upon work completion, pick up all equipment and leave the space.

5.2 PRCS Exit Procedure

- Replace all access covers.
- Ensure all signs are visible and legible.
- Remove all lockout/tagout equipment.
- Note on the permit any problems encountered while in the space.
- Finish the permit and turn it in to the entrant supervisor.
- The entrant supervisor will inspect the permit for completion and investigate any noted problems. Actions taken to correct noted problems will be discussed with all authorized entrants and attendants for future implementation.
- The completed permit will be maintained on file as required in this section.

6.0 NPRCS ENTRY PROCEDURE

NPRCS is a confined space that

1. does not contain any hazard capable of causing death or serious physical harm; and
2. with respect to atmospheric hazards, does not have the potential to contain any hazard capable of causing death or serious physical harm.

Persons entering this type of space only need to complete a confined space entry permit and remain vigilant about conditions in the space and remember that if any condition changes or if hazards are introduced into the space (e.g., welding/cutting operations), the classification and entry procedures in the space may change.

6.1 NPRCS Entry Procedure

1. Check the atmosphere with the gas detector for oxygen, LEL, and other hazardous gases (e.g., methane [CH_4], hydrogen sulfide [H_2S], and carbon monoxide [CO]) in the same order prior to entry into the space.
2. Record the measured conditions on the permit, and do not allow entry if detected levels are above action levels.
3. When entrance covers are removed, guard the opening to prevent an accidental fall through the opening and to protect personnel working in the space from foreign objects entering the space.
4. Proceed with entry and work with caution.

6.2 NPRCS Procedures after Exiting at the End of Work

The following procedures must be followed upon once work is completed and personnel has exited the NPRCS:

1. Replace all access covers.
2. Ensure all signs are visible and legible.
3. Remove all lockout/tagout equipment, if applicable.
4. Note any problems on permit that were encountered while in the space.
5. Finish the permit, and turn it in to the entrant supervisor.
6. The entrant supervisor shall inspect the permit for completion and investigate any noted problems. Actions taken to correct noted problems shall be discussed with all authorized entrants and attendants for future implementation.
7. The completed permit shall be maintained in records for annual review.

7.0 CONFINED SPACE ENTRY TRAINING

Personnel participating in the entry of any confined space must first complete initial confined space entry training equivalent to their assigned duties. In addition, personnel will receive site-specific training covering confined space entry procedures associated with the work site.

7.1 Initial Training

Personnel will not be permitted to perform entry of any confined space prior to completing this training. The training will be administered or approved by the Corporate Safety Manager, and will consist of the following elements:

- Orientation regarding the differences between a NPRCS and a PRCS
- Review of applicable regulatory requirements (29 CFR 1910.146)
- Review of this procedure
- Air monitoring instrumentation calibration and monitoring methods
- Use of respiratory protection and PPE during PRCS operations
- Entrant duties during NPRCS and PRCS entries
- Attendant duties during PRCS entries
  - Includes the entire above plus the following:
    - Emergency notification requirements
    - Emergency response procedures
    - Maintaining the list of authorized entrants
    - Applicable state requirements for attendants

- Entry supervisor duties during PRCS entries includes the entire above plus the following:
    - Accident and problem investigation techniques
    - Recordkeeping requirements

Initial training is intended only to qualify personnel to perform the duties of general confined space entry. This training must be supplemented by site/procedure-specific training prior to any new entry operation.

Refresher training is required any time there is a change in the overall program or procedures or when, based on observation or incident, a substantial noncompliance with this procedure is noted.

7.2 Site/Procedure-Specific Training

Because entry procedures will be specifically developed for individual PRCSs, personnel will require training in the specific procedure(s) prior to on site implementation. Training must be conducted by an authorized supervisor, the SSO, or an approved alternate and must be documented.

7.3 Annual Program Review

At least annually, (or whenever any incident or serious near miss occurs due to confined space entry), an independent authorized employee who is not involved in the procedure being inspected must conduct and document a review and inspection of the confined space entry program specific to the identified facility. The inspection should include a meeting with authorized personnel and any other affected personnel.

The inspection procedure must include the following elements:

- Discuss the responsibilities of the entry supervisors, entry attendant, entrant, and rescuers (where applicable) under the confined space entry program.
- Where a confined space permit is used (PRCS), discuss the entry attendant and entrant personnel's responsibilities under the confined space entry program and the limitations of the program.
- If deficiencies are noted during the inspection, corrective actions and retraining of personnel, as necessary, must be performed immediately.
- Review all confined space permits filed during last 12 months. Review should be focused on any deficiencies recorded on the permit, with appropriate root-cause analysis and preventive and corrective actions.
- The inspector shall provide a copy of all inspection documentation to the applicable Project Manager for review and filing.

These inspections shall provide for a demonstration of the procedures and may be implemented through random audits and planned visual observations. These inspections are intended to ensure that the confined space program is being properly and consistently implemented.

8.0 RECORDKEEPING

- Inventories of confined spaces will be maintained for one year past project completion.
- Cancelled and completed confined space entry permits will be maintained for a minimum of one year.
- Any airborne measurements that represent personnel exposure will be maintained.
- All entry permits will be reviewed annually by a trained entry supervisor to determine if procedures are being followed and are adequate to protect personnel. If necessary, the entry procedures will be modified to ensure personnel are protected when entering locations.

9.0 ATTACHMENTS

Attachment 1 – Facility-Specific Confined Space Identification Log

Attachment 2 – Confined Space Hazard Assessment Form

Attachment 3 – PRCS Space Entry Permit Form

Attachment 4 – Confined Space Entry Classification Guidance

10.0 REFERENCES

HS 132 Competent Persons

Attachment 1

Facility-Specific Confined Space Inventory

Name of Space and Location	Permit-Required Confined Space				Non-Permit-Required Confined Space	
	Y	Initial Date Inventoried			Y	Date Reclassified

Attachment 2

Confined Space Hazard Assessment Form

Part 1: Confined Space Identification	
Confined space name:	
Dimensions:	
Description of space:	
Is this space entered on a routine basis? ☐ Yes ☐ No	
Describe tasks and frequency:	
Part II: Nature of the Hazards Assumptions. Tanks are empty and clean, all energy sources identified and isolated, and no other hazards are introduced into the spaces. A more formal hazard assessment must be done at the time of entry.	
Potential Atmospheric Hazards ☐ O_2 Deficient/Enriched ☐ Combustibles/Flammables ☐ CO ☐ H_2S ☐ Other Toxics	**Potential Nonatmospheric Hazards** ☐ Contains Material That Could Engulf Entrant? _____ ☐ Internal Config. Could Trap Entrant? _____ ☐ Electrical (live circuits)? _____ ☐ Mechanical (pipes, linkages)? _____ ☐ Slick/Residue Covered Surfaces? _____ ☐ Equipment Preventing Safe Exit? _____ ☐ Low/Inadequate Lighting? _____ ☐ Hazardous Chemicals Present? _____ ☐ Fall Potential? _____ ☐ Potential for Dropped Objects? _____ ☐ Multiple Work Groups/Nature of Work _____ ☐ Other _____
Photo of Space Here	

Attachment 3: PRCS Entry Permit Form

1. Permit space to be entered: _____ Project Name & No.: _____
2. Purpose of entry: _____
3. Good on this date only: _____ From: _____ AM/PM _____ To: _____ AM/PM

Authorized Entrants:	Authorized Attendants:	Entry Supervisor:
_____	_____	_____
_____	_____	_____
_____	_____	_____

4. Hazards within the permit space: _____

5. Permit Space Preparation

	Yes	No
1. All energy sources locked/tagged out?	Yes	No
2. All input lines capped/blinded?	Yes	No
3. Permit Space contents drained/flushed/neutralized?	Yes	No
4. Permit Space cleaned/purged?	Yes	No
5. Ventilation provided 30 minutes before entry?	Yes	No

6. Initial atmospheric testing.

	Reading	Time	Acceptable level
Oxygen%	_____	_____	_____
LEL	_____	_____	_____
Other Contaminants	_____	_____	_____
Other Contaminants	_____	_____	_____
Other Contaminants	_____	_____	_____

Test (s) To Be Taken	Permissible Entry Levels	Test 1	Test 2	Test 3	Test 4
A. Percent of Oxygen	19.5% to 23.5%				
B. Explosivity	<10% LEL				
C. Carbon Monoxide	< 25ppm				
D. Hydrogen Sulfide	< 5 ppm				
E. MISC.					
Name of Tester					
Test Times					

7. Rescue Services (circle one) On-Site Off-Site

Phone # for Rescue Services or means of summoning:

_____

9. Communication devices and procedures to be used during entry: _____

_____

10. Safety equipment required for entry:

PPE	N/A ( )	YES ( )	Specify_____
Testing Equipment	N/A ( )	YES ( )	Specify_____
Alarm System	N/A ( )	YES ( )	Specify_____
Rescue Equipment	N/A ( )	YES ( )	Specify_____
Other	N/A ( )	YES ( )	Specify_____

11. Additional Permits Required:

Hot work: _____ Yes _____ No
Other: _____ Yes _____ No

Attachment 3: PRCS Entry Permit Form

I certify that I have inspected the work area for safety and reviewed all safety precautions recorded on this permit.

Permit Authorization by entry Supervisor (Signature):_____ Date/Time_____

13. Permit Conditions Verification:

Physical conditions at confined space checked and verified to be in accordance with the permit Yes No
If no; please record the deviation observed and corrective action taken:

_____
_____

Verified by: _____ _____ _____
(Entry Supervisor) Date Time

14. Review & Close-Out:

Please list problems encountered during entry:

_____
_____

Corrective / Preventive Action Taken:

_____
_____

Additional Precautions / Recommendation for Future Entry:

_____
_____

Based on this review, this confined space shall be considered:

Permit Required Confined Space Yes No
Non-Permit Required Confined Space Yes No

Reviewed By: _____ _____ _____
(Entry Supervisor) Date Time

Attachment 4: Confined Space Entry Classification Guidance

Confined Space Entry Classification Guidance Facility Name Here											
						Meter Readings					
Confined Space Name	**Confined Space Location**	**Task Description**	**Permit Required Confined Space**		**Enter Following Non-permit Procedure**	**O2**	**LEL**	**H2S**	**CO**	**Entry Rescue**	**Nonentry Rescue**

HS 119 Lockout/Tagout Program

HS 119 LOCKOUT/TAGOUT PROGRAM

1.0 PURPOSE

This procedure establishes the minimum requirements for lockout/tagout (LO/TO) and the control of hazardous energy per 29CFR1910.147 to safeguard personnel from the unexpected energization or startup of machinery and equipment or the release of hazardous energy during service or maintenance activities.

2.0 SCOPE

When the following apply, all facilities and/or operations are regulated by this procedure:

- Any personnel (or subcontractor) is required to place any part of his/her body into the mechanism of a piece of equipment or path of hazardous energy for service, maintenance, or repair
- Any personnel (or subcontractor) is required to remove or bypass a guard or other safety device

3.0 DEFINITIONS

Affected Employee: A person whose job requires him/her to operate or use a machine or piece of equipment that is being serviced or maintenance is being performed under LO/TO, or whose job requires him/her to work in an area where such servicing or maintenance is being performed.

Authorized Employee: A person who locks out or tags out a machine or piece of equipment to perform servicing or maintenance on that machine or equipment.

Cord- and Plug-Connected Equipment: Equipment where the only energy source is electrical power provided by a plug-in connection.

Energy Source: Any electrical, mechanical, hydraulic, pneumatic, chemical, radiation, thermal, or compressed gas energy source; energy stored in springs; and potential energy from suspended objects (gravity) that may injure personnel, cause property damage, and/or cause a release of hazardous substance to the environment.

Energized: Connected to an energy source or containing residual or stored energy.

Energy-Isolating Device: A mechanical device that physically prevents the transmission or release of energy. This includes locks, hairpins, tongs, lockable valves, clam shell devices for valves, blank flanges for piping systems, and restraining devices to prevent movement of parts.

Isolation: A physical activity using a device which prevents the transmission or release of energy. Examples of devices used to isolate equipment/systems include, but are not limited to restraint blocks, electrical circuit breakers, disconnect switches, fuses, slip gates, slip blinds, or double valves. Control circuit devices, motor controllers, etc., are not acceptable isolation devices.

Locking Device: A device that uses a lock, key, and identification number to hold an energy isolation device in the safe position to protect personnel.

Lockout: The use of a locking device to ensure that an energy-isolating device and the equipment it controls cannot be operated until the lockout device is removed.

Lockout/Tagout (LO/TO) Specific Procedure: A written procedure developed specifically for each piece of machinery or equipment capable of unexpectedly releasing energy. This procedure outlines in detail how LO/TO will be performed.

Normal Production Operations: Using a machine or piece of equipment to perform its intended production function.

Servicing and/or Maintenance: Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning, or unjamming of machines or equipment and adjusting or tool changing where personnel could be exposed to the unexpected energization or start-up of the equipment or a release of hazardous energy.

Tagout: The use of a warning device to establish that an energy-isolating device and the equipment it controls may not be operated until the tagout device is removed.

4.0 GENERAL PROCEDURE

Only an authorized employee involved with the work can perform LO/TO of energy sources. If more than one employee is involved, either each individual authorized employee must use his/her own lock (multiple lockout), or a group lockout can be performed by the employees' supervisor/foreman. The locks, tags, and equipment shall not be tampered with by any personnel. Only the person originally locking and tagging the equipment is authorized to remove the locks and tags. If the authorized employee who placed the LO/TO device/sign subsequently no longer works for the company or cannot be located, only the authorized supervisor/foreman can remove the locks and tags in accordance with the procedure outlined below for removing unattended LO/TO devices.

4.1 Authorized Employees

Only personnel that have completed training for LO/TO authorized employees will be permitted to initiate and supervise work being performed under LO/TO procedures. Each authorized employee will also be responsible for reviewing any applicable equipment-specific LO/TO procedure prior to initiating work. Any problems identified with the equipment-specific procedure are to be immediately reported as an incident or near miss and should be brought to

the attention of the SSO and Project Manager, and all work on affected equipment should be halted.

4.2 Shift Change Procedures

If ongoing work requires carryover from shift to shift or transfer of responsibility between personnel, the following procedure will be implemented:

- The authorized employee(s) who originally performed the lockout shall walk through the lockout/isolation steps with the new authorized employee.
- At each isolation point, the original authorized employee shall remove his/her LO/TO device(s), to be immediately replaced by the new authorized employee's device(s).
- Upon transfer of the LO/TO equipment, the new authorized employee shall verify that the equipment is still isolated prior to continuing work.

Under no circumstances shall the original devices remain in place and just the keys transferred. For supervisor/foreman and/or group lockouts, the same procedure shall be used with the incoming supervisor/foreman.

4.3 Removal of Unattended LO/TO devices

Only the authorized employee who placed the LO/TO devices on the system can remove the devices, unless the following situations exist:

- The Project Manager has verified that the authorized employee(s) is not on-site (or is no longer employed at the site).
- All reasonable efforts have been made to contact the authorized employee (active employees only) to verify that the work is complete and the devices are about to be removed.
- The Competent Person inspects the LO/TO device and ensures that the equipment is capable of being safely reenergized.

If all the above apply, the locks and tags can be removed at the direction of the Competent Person. The Competent Person shall complete a *Lock and Tag Removal* form (Attachment 1) to document the event prior to removing the lock and shall keep it on record for a period of one year.

UNAUTHORIZED REMOVAL OF A LO/TO DEVICE WILL RESULT IN IMMEDIATE DISMISSAL

5.0 SPECIFIC LO/TO PROCEDURES

Written procedures will be developed for the LO/TO of each piece of equipment that has potentially hazardous energy sources (except as noted below). Each procedure must be reviewed

and approved by the Competent Person prior to implementation. Equipment-specific written LO/TO procedures are not required, if all the following conditions are met:

- The equipment's only potential energy source is electrical.
- The unexpected startup of the equipment is controlled by unplugging the equipment from the electrical source.
- The plug is under the exclusive control of the person performing the work.

Additionally, equipment-specific LO/TO procedures are not required if all the following apply:

- The machine has no potential for stored or residual energy or reaccumulation of stored energy after shutdown (i.e., contains a capacitor to store electrical energy or pressurized tank to store air/gas).
- The machine has a single energy source that can be readily identified and isolated If more than one energy source is present (e.g., gas and electric), then written procedures shall be developed.
- The isolation and locking out of the energy source completely deenergizes and deactivates the equipment.
- Servicing of the machine requires that its energy source must previously have been locked out and tagged out in accordance with this section.
- A single lock-out device achieves a locked-out condition.

5.1 Procedure Outline

All equipment-specific LO/TO procedures will be prepared to meet the following steps:

- Identify type and magnitude of energy. Discuss with all staff prior to initiating procedures.
- Notify affected employees that the machine/equipment will be shut down and locked out for servicing. Shut down machine/equipment by normal stopping procedure.
- Identify all energy-isolating device(s) for the machine or equipment being serviced.
- Lock out each device with individual locks. Tag out only if a device is not capable of being locked out.
- Relieve or restrain stored and residual energy.
- Verify the isolation of equipment and its zero-energy state.
- Complete the *LO/TO Verification Checklist* (Attachment 2)
- Perform work.
- Check work area to remove nonessential items and ensure equipment components are intact.

- Check work area to ensure all personnel are removed from the area.
- Verify that the controls are in neutral (off).
- Remove lockout device(s).
- Notify affected employees that the machine/equipment is ready for use.
- Reenergize the machine or equipment

Attachment 3 is provided as a template for preparing equipment–specific LO/TO procedures.

5.2 Emergency Lock Removing Procedures

This procedure will only be used in an emergency defined as an event that may cause injury, fire, explosion, over exposure, or other hazards to the general public, the environment, or personnel.

If a lock must be removed by a person other than the authorized employee who placed the LO/TO, the following lock removing procedure will be implemented by the Competent Person:

- Investigate and verify that all equipment and material in relation to the work has been completed and/or put into a safe configuration.
- Ensure all personnel have been removed from the hazardous location.
- Attempt to contact the authorized employee that originally provided LO/TO to verify he or she is no longer in the hazardous location or is aware that the LO/TO is being removed.
- Complete the *Emergency LO/TO Removal* form (Attachment 4). The *Emergency LO/TO Removal* forms will be kept in the project file for a period of one year and must be readily available.
- Whenever a LO/TO is removed for emergency purposes by anyone other than the authorized employee who placed the LO/TO, that person and all affected personnel must be contacted prior to the start of their next shift to inform them that the equipment/system is no longer locked out and tagged out.

6.0 NON-EQUIPMENT-SPECIFIC LO/TO PROCEDURES

In the absence of an equipment-specific LO/TO procedure, the following procedures, in combination with a completed Job Safety Analysis (JSA), can be used as an acceptable substitute.

6.1 Process Equipment

- Determine what energy sources are present, such as electrical, gas, pressurized systems (e.g., steam, water, and hydraulics), heated fluids or gas (e.g., steam, hot water), and gravity (e.g., presses, elevated vehicles).
- Determine which of these sources requires isolation to perform the work.

- Determine the locations where each energy source for that piece of equipment can be turned off/isolated and be locked out. For example, if a machine has an on/off button, pushing the button to the off position is not sufficient isolation, since the button cannot be locked out. You must then either unplug the equipment or find, close, or lock out the circuit breaker or electrical switch supplying the machine.
- Make sure anyone in the area knows you are about to turn off and lock out the equipment, and then close the isolation devices. Once closed, lock out the isolation devices so they cannot be inadvertently opened.
- Place an appropriate tag on each lock out device, with the appropriate warning (e.g., Do Not Open, Do Not Start) with date and time of isolation and a means of identifying who has performed the lockout.
- Once everything is locked out, verify that the isolation was successful by following manufacturers' directions or standard trade practice. Means of determining whether isolation was successful include:
  - Try to turn the equipment on.
  - Use pressure relief valves.
- Complete the *LO/TO Verification Checklist* (Attachment 2)
- Perform the necessary work.
- Ensure all tools and parts are removed from the work area.
- Remove the tags and locks used to isolate the various energy sources.
- Open each isolation source. For fluid or gas systems, check for leaks at the area the work was performed as necessary.
- Inform personnel in the area that the LO/TO systems have been removed.
- If additional work is required (e.g., repair of leak, fine tuning of work), the LO/TO procedure must be reestablished. Under no circumstances shall work be performed on the equipment without prior isolation of the energy sources.

6.2 Electrical Systems

In general, site personnel will provide LO/TO services in low-voltage situations only (i.e., voltage is below 220 volts). For high-voltage situations (above 220 volts), an electrical subcontractor with high-voltage certification and appropriate training will be used.

6.3 General Low-Voltage Procedure

1. Make sure the equipment to be worked on is turned off.
2. Locate the source of the electrical supply and isolate the equipment. This can be accomplished by the following:
   a. Turning the appropriate circuit breaker off
   b. Unplugging the equipment

c. Disconnecting the source from the battery (e.g., pulling cables from automotive batteries)

3. Lock the isolation circuit in the closed position using an appropriate locking device and a unique lock and key system.
4. Tag the locked-out circuit. The tag used shall warn against the hazard (e.g., Do Not Start), and include a means of identifying the authorized employee who installed the tag and lock.
5. Go back to the equipment and try to turn it on to ensure that the proper source has been isolated. If the machine turns on, reverse the above steps (2 through 4), and start again until the proper circuit is isolated. Do not perform the task until proper isolation is performed and verified. The Competent Person is responsible for developing the written procedure for LO/TO of this equipment prior to authorizing rework on it.
6. Complete the *LO/TO Verification Checklist* (Attachment 2)
7. Perform the required work.
8. Upon completion of the work, inspect the area to ensure all tools and parts are removed. If tools or parts are noticed after the energy source is no longer locked out, steps (1–5) must be performed again prior to retrieval of the tools/parts. Under no circumstances shall the items be retrieved without the equipment being locked out.
9. Inform anyone in the area that work has been completed and equipment is being energized.
10. Remove the tag and lock.
11. Turn on the closed circuit following the appropriate procedures (or reconnect the battery cables).
12. Turn the equipment on to verify operation.

6.4 Pressurized Water or Air/Gas

1. Turn the appropriate valve upstream from the area of work to the off position (closed). If steam or water can enter the pipe from the normal downstream side, either verify that the check valve is operating properly or ensure that all necessary valves have been closed to stop all fluid or steam flow into the section to be worked on. If this procedure is being used in preparation of confined space entry, positive isolation (i.e., line break, blind plate, or double-block and bleed) must be established on both sides prior to authorizing confined space entry.
2. Using the appropriate device, lock the valve(s) in the closed position using a unique lock and key. Tag the locked-out valve(s). The tag shall warn against the hazard (Do Not Open) and include date and time of isolation and a means of identifying the authorized employee who installed the lock and tag.
3. Allow the system to be worked to cool down (in the case of steam or hot water).

4. Relieve the pressure in the system, and then drain any fluid from the system. If the system is not equipped with a pressure relief or drain system, make sure the pipes are cool to the touch, and slowly open and drain in accordance with standard trade practice.
5. Once the system has been bled to atmospheric pressure, the pipes or lines shall be disconnected, blinded, or closed by a valve and locked out and/or tagged accordingly. Observe line entry procedures when first opening the line.
6. Complete the *LO/TO Verification Checklist* (Attachment 2)
7. Perform the necessary work.
8. Ensure all sections are secure and closed.
9. Remove the tag and lock.
10. Slowly open the valve, stopping when water or steam flow starts. Observe the work performed to make sure no leaks are evident. If there are no leaks, then the valve can be completely opened. If leaks are observed, then reclose the valve, and follow steps 2–5 above to reapply the LO/TO to the system.

6.5 Natural Gas Lines

- Turn off the valve upstream from the area to be worked.
- Using the appropriate device, lock the valve in the closed position using a unique lock and key.
- Ensure all spark sources in the area have been isolated or removed.
- Using nonsparking tools, remove the remaining gas in the line using standard trade practice. If in an enclosed area, make sure the area is appropriately ventilated. If the flow of gas does not stop, shut down the next upstream valve or the gas main valve. Each additional valve closed must be locked out and tagged out.
- Complete the *LO/TO Verification Checklist* (Attachment 2)
- Perform the required work. If hot work is necessary (i.e., soldering, grinding, welding), make sure the line has been purged of gas and that the hot work requirements of this manual are followed including explosivity check prior to authorizing work.
- Make sure that all connections are secure. Also, have a solution of soap and water for leak testing.
- Remove all tools and parts from the area.
- Remove the lock(s) and tag(s) from the valve(s).
- Slowly crack open the valve(s).
- Test the work area for leaks using the soap solution. If leaks are detected, the system must be locked out and tagged out following steps 1–4 above before additional repairs can be made.

- If no leaks are detected, gradually open the isolation values to their normal position.

7.0 TRAINING AND REVIEW

7.1 Annual Program Review

At least annually (or whenever any incident or serious near-miss occurs due to inadequate LO/TO procedures), an independent authorized employee who is not involved in the procedure/equipment being inspected must conduct and document a review and inspection of the Energy Control Program specific to the identified facility. The inspection should include a meeting with authorized employees and any other affected employees.

The inspection procedure must include the following elements:

- Where lockout is used, discuss the authorized employee's responsibilities under the LO/TO program with the inspector.
- Hold group meetings with the authorized employees who are performing the inspection and all authorized employees who implement the procedure.
- Where tagout is used, discuss the authorized employee's responsibilities under the LO/TO program and the limitations of the tagout system.
- Review of LO/TO verification checklists and other documentation to ensure procedure is being correctly followed and documented.
- If deficiencies are noted during the inspection, corrective actions and retraining of personnel, as necessary, must be performed immediately.
- The inspector shall provide a copy of all inspection documentation to the applicable Project Manager for review and filing.

These inspections shall at least provide for a demonstration of the procedures and may be implemented through random audits and planned visual observations. These inspections are intended to ensure that the energy control procedures are being properly and consistently implemented.

7.2 Training

Authorized employees involved in or affected by lock out will be trained in the following areas before being allowed to work in the area:

- Recognition of hazardous energy sources
- Types and magnitudes of energy sources located in the workplace
- Procedures for energy isolation and control, including specific procedures developed for specific equipment and systems
- Purpose and use of the energy-control (LO/TO) procedure, equipment, and devices

- Prohibitions and penalties for attempting to restart or reenergize equipment which has been locked out and tagged out or to work on equipment without following the LO/TO procedures.

Authorized employees are limited to those departmental supervisors and managers, and those selected employees who have successfully completed all the required training listed above.

Affected employees will be trained in the purpose and use of the LO/TO procedure. All employees whose work operations may be in an area where LO/TO procedures may be used will be trained about the procedure and about the prohibition relating to attempts to restart or reenergize machines or equipment that are locked out/tagged out. These personnel are not required to be familiar with specific procedures for equipment and systems.

Retraining or refresher training for authorized and/or affected employees will be conducted annually or whenever one of the following exists:

- The employee has a change in job assignment.
- There has been a change in the equipment or process.
- There has been a change in the energy-control procedure.
- An inspection reveals deviations from the standard procedures or inadequacies in the employee's knowledge or use of the LO/TO procedure.
- An incident occurs because of unexpected energy release.

Personnel training records will include type of training, date, and employee name. These records will be maintained for each employee for the duration of their employment **(Attachment 5).**

8.0 ATTACHMENTS

Attachment 1 - Lock and Tag Removal Form

Attachment 2 – LO/TO Verification Checklist

Attachment 3 - Equipment-Specific LO/TO Procedure Template

Attachment 4 - Emergency Lock Removal Form

Attachment 5 – Employee Training Record

9.0 REFERENCES

HS 118 Confined Space Entry Program

HS 132 Competent Persons

Attachment 1

Lock and Tag Removal Form

Tag Number	Lock Number	Location Used	Component Affected	Date/Time Attached	Manager/Supervisor	Date/Time Returned

Attachment 2

Lockout/Tagout Verification Checklist

Equipment ID (#) LO/TO Location(s)- Devise Type & Number: Date:_____

_____

LO/TO Reference Number: _____

Lockout/Tagout Checklist	**Yes**	**No**	**Initials**
EMPLOYEE NOTIFICATION Have all affected employees been informed that a LO/TO is necessary and the reason for the LO/TO?			
ENERGY SOURCE IDENTIFICATION Has the type and magnitude of all energy sources and the respective method of control been identified?			
EQUIPMENT SHUTDOWN Has the machine/equipment been shut down by the normal stopping procedure (depressing the stop button, open switch, close valve, etc.)?			
DEACTIVATING ENERGY ISOLATING DEVICE Have all energy-isolating devices been deactivated so that the machine/equipment is isolated from all energy sources?			
LOCK OUT Has a lock been placed on all appropriate energy-isolating devices with an assigned individual lock(s)?			
TAG OUT Has a tag been placed on all appropriate energy isolating devices?			
ENERGY DISSIPATION Has all stored/residual energy (such as capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, air, gas, steam, or water pressure) been dissipated/restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.?			
ZERO ENERGY STATE VERIFICATION Has verification been made that the equipment is disconnected from all energy sources by first checking that no personnel are exposed, then verifying the isolation of the equipment by operating the push button or other normal operating controls?			
IF SO, THE EQUIMPENT IS NOW LOCKED OUT			
Restoring Equipment to Service	**Date:**		
JOB COMPLETION VERIFICATION Hs the machine/equipment and immediate area been checked to make sure that nonessential items have been removed and the machine/equipment components are operationally intact?			
PERSONNEL VERIFICATION Have all personnel been safely positioned or removed from the area and all controls are in neutral?			
LOCKOUT REMOVAL AND EQUIPMENT STARTUP Have all LO/TO devices been removed and the machine reenergized?			
EMPLOYE NOTIFICATION Have all affected employees been notified that the LO/TO is complete and that the machine/equ9ipment is ready for use?			

Notes:

Attachment 3

Equipment-Specific Lockout/Tagout Procedure

EQUIPMENT:	
EQUIPMENT NO:	LOCATION

PURPOSE:

This 7-step procedure establishes the minimum requirements for the lockout of energy isolating devices whenever servicing or maintenance is done on facility equipment. This procedure will be used to ensure that the equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any maintenance where the unexpected energization or startup of the equipment or release of energy could cause injury.

COMPLIANCE WITH THIS PROCEDURE
All employees are required to comply with the restrictions and limitations imposed on them during the use of this procedure. The authorized employees are required to perform the lockout in accordance with this procedure. Other employees, upon observing a piece of equipment which is locked and/or tagged out, will not attempt to start, energize, or use said equipment.

SEQUENCE OF LO/TO

1. All affected employees will be notified that the equipment must be shut down and locked out to perform servicing or maintenance.

Specific Instructions:

2. The authorized employee will identify the type and magnitude of the energy that the equipment utilizes, will understand the hazards of the energy, and will know the methods to control the energy.

Energy

_____ Electrical	____ Natural Gas	____ Spring
_____ Hydraulic	____ Gravity	____ Steam
_____ Chemical	____ Pneumatic	____ Thermal
_____ Other		

Attachment 3

Equipment-Specific Lockout/Tagout Procedure (cont)

3. Shut down operating equipment by the normal stopping procedures (depress stop button, open switch, close valve, etc.). Specific Instructions:
4. Deactivate the energy isolating device(s) so the equipment is isolated from the energy source(s). Specific Instructions:
5. LO/TO the energy isolating device(s) with assigned individual locks and tags. Lockout Equipment Needed:
6. Dissipate any stored or residual energy (such as that in capacitors, springs, hydraulic systems, and air, steam, or water pressure etc. by methods such as grounding, repositioning, blocking, bleeding down, etc. Specific Instructions:
7. Ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the normal operating control(s) or by testing to make certain the equipment will not operate. CAUTION: Return controls to "OFF" after verification. THE EQUIPMENT SHOULD NOW BE LOCKED OUT AT ZERO ENERGY STATE. Specific Instructions:
METHODS OF VERIFICATION
Verification should be determined via start-up attempts, visual observations and testing. For electrical verification, place local on/off switch to ON position and verify equipment will not operate. Return the switch to OFF position and commence work.

Attachment 4

Emergency Lock Removal Form

1. NAME of personnel who's LO/TO is to be removed:
2. METHOD(s) used to contact personnel who's LO/TO is to be removed:
3. LOCATION of LO/TO:
4. REQUIRED CONTACTS: Contact the following project personnel to locate affected contractor personnel:

Contact Name 1:			
Organization/Firm	**Office Phone #**	**Home Phone #**	**Cell #**
Contact Name 2:			
Organization/Firm	**Office Phone #**	**Home Phone #**	**Cell #**
Contact Name 3:			
Organization/Firm	**Office Phone #**	**Home Phone #**	**Cell #**
Contact Name 4:			
Organization/Firm	**Office Phone #**	**Home Phone #**	**Cell #**

This form will only be used in an emergency situation. For this form, an emergency is defined as an event that may cause injury, fire, explosion, over exposure or other hazards to the general public, the environment or personnel.

5. NOTIFICATION:

Has the responsible client representative been contacted? Yes No

Notification Verified By: (Initial) or, the special conditions for not contacting the client responsible are as follows:

6. WALK DOWN:

	Print Name	Signature	Date
Project Manager			
Site Safety Officer			
AFTER COMPLETING THESE STEPS, THE LOCK AND TAG MAY BE REMOVED This form must be provided to the Project Manager so the affected employee can be notified that his/her LO/TO has been removed			

Attachment 5

Employee Training Record

Authorized Employees		
Employee Name	**Title**	**Training Date**
Affected Employees		
Employee Name	**Title**	**Training Date**

Notes:

HS 120 Fall Protection Program

Health & Safety Procedures

Procedure: HS 120
Date: February 2018
Revision: 1

HS 120 FALL PROTECTION PROGRAM

1.0 PURPOSE

This program sets forth the minimum requirements for continuous safety of personnel through the means of fall hazard elimination, fall prevention, and fall protection whenever working above ground level or above a recognized hazard and will comply with applicable Occupational Safety and Health Administration (OSHA) Construction Standards for Fall Protection to include 29CFR1926 Subpart M and 29CFR1926.501-.503.

2.0 SCOPE

This procedure applies, in its entirety, to the site. All personnel will follow the appropriate OSHA, state, and/or local regulatory requirements.

3.0 DEFINITIONS

Controlled Access Zone (CAZ): An area in which certain work (e.g., overhand brick laying) may take place without the use of guardrail systems, personal fall-arrest systems, or safety net systems and access to the zone is controlled. Note: Inspection activities conducted within the CAZ directed at observing overhand bricklaying or other leading-edge work conducted under a fall protection plan is not included under the exemption for work in a CAZ (i.e., inspectors or engineers within a permitted CAZ must be protected from falling by a personal fall protection system).

Dangerous Equipment: Equipment that, as a result of form or function, may be hazardous to personnel who fall onto or into such equipment (e.g., pickling or galvanizing tanks, degreasing units, machinery, electrical equipment).

Fall Hazard Elimination: Planning of work tasks and site layout leading to alternative approaches in which a fall hazard does not exist. Examples include location changes of equipment or procedural changes that do not require exposure to elevated work areas.

Fall Prevention: Any means used to prevent a fall to a different level. Examples include use of guardrails, barriers, or physical travel restriction systems to prevent personnel from direct and unprotected exposure to a fall hazard.

Fall Protection: The use of personal fall protection equipment designed to control the free fall hazard from the elevated work area. Personal fall protection equipment shall consist of an approved full body harness and lanyard with a locking type snap hook and an energy absorber or a vertical fall arrest system that meets the requirements of 29 CFR 1926.502(d). Fall protection also necessitates proper work place and work process assessment including all anchorage considerations.

Full-Body Harness: Straps secured about the employee in a manner that will distribute the fall-arrest forces over the thighs, pelvis, waist, chest, and shoulders with means for attaching it to other components of a personal fall-arrest system.

Guardrail System: A barrier erected to prevent employees from falling to lower levels.

Low-Pitched Roof: A roof having a slope ratio less than or equal to 4 feet vertical rise for every 12 feet horizontal (15^0).

Parapet: A low wall projecting from the edge of a platform, terrace, or roof.

Personal Fall Protection System: A system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, and a full-body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these.

Qualified Person: One who can identify existing and predictable fall-related hazards in their surroundings or working conditions, and who has authorization to take prompt corrective measures to eliminate them.

Walking/Working Surface: Any surface, whether horizontal or vertical, on which personnel walks or works, including but not limited to floors, roofs, ramps, bridges, runways, formwork and concrete reinforcing steel, but not including ladders, vehicles, or trailers, on which personnel must be positioned to perform their job duties.

4.0 PROCEDURE

The requirements of this procedure shall be implemented whenever personnel are exposed to work conditions where in-use walking/working surfaces are located 6 or more feet above the immediate lower level.

4.1 Responsibilities

4.1.1 Project/ Managers and/or Site Supervisors

Each Project Manager and/or site supervisor shall be responsible for ensuring the following items are completed:

- Each worksite is surveyed, and all activities are reviewed to identify the hazards of personnel falling from elevations.
- Methods to address fall hazards are considered in the following order prior to beginning work and the hazards and control measures are addressed in a job safety analysis (JSA):
    - Eliminate the need for elevated work.
    - Provide fall prevention to minimize the risk of a fall.
    - Provide fall protection to manage the risk of a fall.
- Audits of the worksite are performed to ensure compliance with this program.

- Appropriate inspections are performed on fall prevention equipment and fall protection systems.
- All fall protection equipment users have the knowledge and skills to properly use the equipment and understand this program.
- A competent person designs fall protection anchorage points and systems on all new and revised construction projects.
- Contractors are notified of the fall protection requirements during any prebid conference and in the construction specifications of any project.

4.1.2 All Personnel

Individual employees shall assure that they

- never perform work in an area where they are exposed to a fall of 6 feet or greater without implementing fall prevention/fall protection system;
- know and understand the proper use and limitations of the fall protection equipment so as not to exceed those limitations; and
- inspect the fall protection equipment prior to each use and tag and destroy worn, frayed, or damaged equipment. All equipment subjected to an actual fall or similar stress shall be tagged as "out of service" until a final investigation is completed.

4.2 General Requirements

Each worksite and all activities shall be evaluated prior to the start of the job to identify the hazards of falling from any elevation. The result of this evaluation shall be described in the job safety analysis (JSA) and/or activity-specific fall protection program. Site-specific fall protection programs shall identify the areas and activities requiring fall protection, how fall protection will be accomplished, a list of qualified individuals for fall protection, and a roster of personnel authorized to use specific fall protection equipment. As part of this evaluation, all applicable requirements of 29 CFR 1926 Subpart M shall be addressed.

- All personnel and subcontractor personnel on walking/working surfaces 6 feet or more above the immediate lower level shall be protected from falling by a guardrail system, safety net system, or personal fall-arrest system 100% of the time.
- All elevated work, regardless of the height, shall incorporate job planning to anticipate and mitigate the consequences of a fall. Job planning should include rescue after a fall.
- First consideration shall be given to eliminating fall hazards. If a fall hazard cannot be practically eliminated, second consideration shall be implementing effective permanent or temporary means of fall prevention.
- The Competent Person must determine if any equipment, pipelines, or trusses for elevated work are suitable for climbing or walking on before they are used. Not all pipelines, trusses, and hanger systems are designed to support individuals doing

elevated work. For example, walking on pipelines may cause flanges to leak, damage insulation, damage tracing, or deform piping.

- Weather must be a safety consideration whenever outdoor elevated work is to be done. The weather hazard must be addressed prior to and during the work.
- When fall protection is required, a personal fall arrest system must be used that complies with 29 CFR 1926.502(d) (full body harness with a fall arrest system).

The following are specific situations/work areas that require fall protection:

- **Aerial life devices:** Personnel operating or working from an aerial lift platform shall wear fall protection equipment with the lanyard attached to a designated anchor point. When exiting or entering an aerial lift device at elevated heights, the use of continuous fall protection is required.
- **Elevated work stations:** Personnel working from elevated work stations of 6 feet or greater and not protected by fall prevention shall use fall protection.
- **Scaffold erection/disassembly:** Personnel engaged in erecting or disassembling scaffold shall use fall protection. These options include, but are not limited to, vertical and self-retracting lanyard lifeline attachments to associated structures and horizontal lifeline attachments when guardrails are not installed. Scaffolds shall be adequately secured if they are used as an anchorage point. Braces and/or couplers of scaffolds shall not be used as anchorage points.
- **Ladders:**
    - **Portable:** When working from a portable ladder and the work requires using both hands, fall protection shall be used whenever working at 6 feet or above, as measured from the ladder base to the bottom of the employee's feet unless a Safe Operating Procedure for the job is approved by the Project Manager.
    - **Fixed:** Any fixed ladder 20 feet in height or greater must be equipped with a cage or fall arrest device. For fixed ladders less than 20 feet in height, ladder climbing devices shall be used whenever available and are the preferred method of ladder travel. Personnel are allowed to climb or descend a fixed ladder of less than 20 feet in height without fall protection or a cage only where both hands are free for climbing.
- **Crane-suspended platforms:** Personnel working from or riding in any crane-suspended platform shall wear fall protection with a lanyard attached to the boom or basket. Work platforms shall not be used in winds over 15 miles per hour; during electrical, snow, ice, or sleet storms; or other adverse weather conditions which could affect the safety of personnel.
- **Designed access ways:** Personnel using designed access ways (e.g., cab accesses, crane accesses, trucks, railcars) may climb or descend the access way using a minimum of three points of contact (hands and feet).

- **Working on a flat roof or low-pitched roof (≤ 15 degrees):** Personnel working within 6 feet of any unprotected roof edge or opening (i.e., not protected by a guardrail, or a parapet of at least 39 inches in height) are required to use fall protection. When working more than 6 feet from an unprotected roof edge/opening, a warning line system shall be erected that is not less than 6 feet from the edge, unless some other means of fall prevention is in use. A safety observer is not an acceptable fall prevention system.

- **Working on a sloped roof (> 15 degrees):** Personnel working on any sloped roof (>15 degrees slope) shall always use fall protection.

- **Trucks, railcars, and large equipment:** Personnel working on top of trucks, railcars, and large equipment shall use fall prevention or protection systems.

- **Pole access:** Pole climbing is the least-preferred method of pole access. Alternatives include bucket trucks, pole sharks, etc. All pole climbing requires a Safe Operating Procedure approved by the Competent Person. Lineman belts are acceptable climbing devices for first up or last down when used by qualified personnel for access only. Approved fall protection equipment shall be used once the work station has been attained and by all subsequent climbers.

Using body belts (safety belts) as part of personal fall-arrest systems is prohibited.

The area(s) onto which objects could fall shall be barricaded. Employees shall be prohibited from entering the barricaded area. Potential falling objects located on higher levels shall be kept far enough from the edge so that they would not go over the edge if they were accidentally displaced.

Inspection and test records for fall protection equipment shall be maintained in the project records at the site for at least 12 months.

4.3 Guardrail Systems

- When guardrail systems are used, they shall meet the requirements given in 29 CFR 1926.502(b).
- The top edge of the guard rail shall be from 39 inches to 45 inches above the walking/working surface. When employees are using stilts, the minimum height of the top rail shall be increased by the height of the stilts.
- Midrails, screen, or mesh shall be installed unless there is a wall or parapet wall at least 21 inches high outside of the guardrail.
- Guardrails shall be constructed to withstand a lateral or downward vertical force of 200 pounds without failure. Midrails, screen, mesh, or equivalent shall be constructed to withstand a lateral or downward vertical force of 150 pounds without failure. Guardrails constructed in accordance with Appendix B to Subpart M of 29 CFR 1926, shall be considered adequate.
- Guardrail components shall be smooth and free of projections.

- Top rails and midrails shall be at least 1/4 inch in diameter or thickness. When wire rope is used for top rails, it shall be flagged with high visibility material at not more than 6-foot intervals.

4.4 Safety Net Systems

- When safety nets are used, they shall be installed as close as possible under the walking/working surface, but never more than 30 feet below the surface. The fall area between the working level to the net shall not be obstructed.
- The perimeter of the net shall extend beyond the edge of the walking/working surface as follows:

Vertical distance from working level to horizontal plane of net	Minimum required horizontal distance of outer edge of net from the edge of the working surface
Up to 5 feet	8 feet
More than 5 feet up to 10 feet	10 feet
More than 10 feet	13 feet

- Nets shall be suspended above objects below the net so that the net does not contact lower objects when subjected to the drop test described below.
- Safety nets and all supporting components shall be subjected to a drop test after the initial installation of the net and before being placed into service, after being relocated, after major repair, and every 6 months if left in place for that period. The drop test shall be conducted using a 400-pound bag of sand, 30 ± 2 inches in diameter. The sand bag shall be dropped into the net from the highest point employees will occupy on the working level, but not less than 42 inches above the net.
- Instead of the drop, personnel may certify that the safety net installation complies with the requirements above. If certification is to be made, the certification shall be made in compliance with 29 CFR 1926.502(c) (4) (ii).
- Defective nets shall not be used. Safety nets and components shall be inspected at least weekly for wear, damage, and deterioration. Safety nets shall also be inspected following any fall into the net and after any other incident that could affect the integrity of the net system. Any defective components discovered shall be replaced and removed from service.
- Materials, tools, scrap, etc., which have fallen into the net shall be removed as soon as possible and at least before the next work shift.
- The maximum size of any opening in the net, and between net panels, shall be 6 inches. Mesh crossings shall be secured to prevent enlargement of the mesh openings.

- Each net and net section shall have a border rope for webbing. The minimum breaking strength of the border rope shall be 5,000 pounds.

4.5 Personal Fall Protection Systems

- Connectors shall be drop-forged, pressed or formed steel, or made of equivalent materials. Connectors shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to interfacing parts of the system.
- D-rings and snaphooks shall have a minimum tensile strength of 5,000 pounds. D-rings and snaphooks shall be proof-tested to a minimum tensile load of 3,600 pounds without cracking, breaking, or taking permanent damage.
- Snaphooks shall be the locking type and designed and used to prevent disengagement of the keeper by the connected components.
- On platforms such as suspended scaffolds with horizontal lifelines, devices used to connect to the lifeline shall be capable of locking in both directions on the lifeline.
- Lifelines shall be protected against being cut or abraded. Horizontal lifelines shall be part of a complete system designed, installed, and used under the supervision of a qualified person.
- The system shall have a safety factor of at least two. Lanyards and vertical lifelines shall have a minimum breaking strength of 5,000 pounds.
- When vertical lifelines are used, each employee shall be attached to separate lifelines. For construction of elevator shafts, see 29 CFR 1926.502(d) (10) (ii).
- Lifelines and lanyards that limit free fall distance to 2 feet or less shall be able to sustain a minimum tensile load of 3,000 pounds applied with the lifeline or lanyard in the fully extended position. Lifelines and lanyards that do not limit free fall distance to 2 feet or less, ripstitch lanyards, and tearing and deforming lanyards shall be able to sustain a minimum tensile load of 5,000 pounds applied with the lifeline or lanyard in the fully extended position.
- Ropes and straps used in lanyards, lifelines, and strength components of body harnesses and belts must be made from synthetic fibers.
- Anchorages used for attachment of personal protective equipment shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5,000 pounds per employee attached.
- Personal fall protection systems shall limit the maximum arresting force on an employee to 1,800 pounds when using a body harness; limit free fall distance to 6 feet (4 feet in California) (where this maximum distance will not cause the employee to contact any lower level); limit deceleration distance to 3.5 feet; and be able to withstand twice the potential impact energy of an employee falling 6 feet or the maximum free fall distance permitted by the system.
- Body harnesses and components shall not be used to hoist material or equipment.

- Personal fall protection systems subject to impact loading shall be immediately tagged and removed from service and be inspected by a competent person prior to reuse.
- Equipment and procedures to ensure a prompt rescue in the event of a fall shall be in place at work sites where elevated work locations exist.
- Personal fall-arrest systems shall be visually inspected prior to each use for wear, damage, and other deterioration; defective components shall be tagged and removed from service. A checklist provided by the manufacturer should be used to document these inspections. If one is not available, Attachment 1 (*the Fall Protection System Safety Checklist*) provides a generic checklist.
- Weekly inspections of each personal fall-arrest system will be performed and documented by each organization located at the site. The *Monthly Harness/Lanyard Inspection Checklist* (Attachment 2) or equivalent, as reviewed and accepted will be used.
- Personal fall-arrest systems shall not be attached to guardrail systems.

4.6 Positioning Device Systems

- Positioning devices shall be rigged so that personnel cannot free fall more than 2 feet.
- Positioning devices shall be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall, or 3,000 pounds, whichever is greater.
- Positioning device systems shall be inspected prior to each use for wear, damage, and other deterioration; defective components shall be removed from service.
- Body harnesses and components shall not be used to hoist material or equipment.

4.7 Warning Line Systems

- The warning line shall be erected around all sides of the roof work area.
- When mechanical equipment is being used, the warning line shall be erected not less than 6 feet from the roof edge parallel to the direction of mechanical equipment operation, and not less than 10 feet from the roof edge which is perpendicular to the direction of mechanical equipment operation.
- Points of access, material handling areas, storage areas, and hoisting areas shall be connected to the work area by an access path formed by two warning lines.
- When the path to a point of access is not in use, a rope, wire, chain, or other barricade, equivalent in strength and height to the warning line, shall be placed across the path at the point where the path intersects the warning line.
- Warning lines shall consist of ropes, wires, or chains, and supporting stanchions. The rope, wire, or chain shall have a minimum tensile strength of at least 500 pounds.

- The rope, wire, or chain shall be flagged at no more than 6-foot intervals with high visibility materials. The line shall be attached to stanchions so that pulling on the line between stanchions will not result in slack being taken up in adjacent sections.
- The lowest point (including sag) of the rigged warning line shall not be less than 34 inches, and the highest point not more than 39 inches, above the walking/working surface.
- Personnel shall not be permitted in the area between a roof edge and warning line unless the employee is performing roofing work in that area.
- Mechanical equipment used on roofs shall be used or stored only in areas where personnel are protected by a warning line system, guardrail system, or personal fall arrest system.

4.8 Controlled Access Zones (CAZ)

- When used to control access to leading edge work, the CAZ shall be defined by a control line, or other means.
- Control lines shall be erected between 6 feet and 25 feet from the unprotected or leading edge, except when erecting precast concrete members. In this case, the control line shall be not more than 60 feet from the edge or half the length of the member being erected, whichever is less.
- The control line shall extend along the entire length of the unprotected or leading edge and shall be approximately parallel to the edge. The control line shall be connected on each side to a guardrail system or wall.
- The control line shall be flagged at no more than 6-foot intervals with high-visibility materials.
- The line shall have a minimum breaking strength of 200 pounds.

4.9 Safety Monitoring Systems

- On leading edge operations, precast concrete erection work, or residential construction work, safety monitoring systems are permitted only for roofing operations on flat/low-slope roofs and only where it is not feasible or would create a greater hazard to use a conventional fall protection system. Except for roofing work on flat or low-slope roofs, personnel protected by a safety monitoring system shall also be covered by a fall protection plan (see Section 4.12 below).
- When safety monitoring systems are used, competent personnel shall be designated to monitor the safety of other personnel, and the monitor shall observe the following requirements:
    - The safety monitor shall be competent to recognize fall hazards.
    - The safety monitor shall warn personnel when the personnel are unaware of fall hazards, or when personnel are acting in an unsafe manner.
    - The safety monitor shall be on the same walking/working surface and within sight of the personnel being monitored.

    - The safety monitor shall be close enough to orally communicate with the personnel being monitored.
    - The safety monitor shall not have other duties that interfere with the monitoring function.
- Mechanical equipment shall not be used or stored in areas where safety monitoring systems are being used on low-slope roofs.
- Personnel not covered by a fall protection plan or not performing roofing work on low-slope roofs, shall not be permitted in areas where personnel are protected by a safety monitoring system.
- Personnel protected by a safety monitoring system must promptly obey directions from the safety monitor.

4.10 Floor, Roof, and Other Walking/Working Surfaces

- Covers in roadways and vehicular aisles shall be able to support at least twice the maximum axle load of the largest vehicle expected to cross over the cover.
- All other covers shall be able to support at least twice the weight of employees, equipment, and materials that may be imposed on the cover at any one time.
- All covers shall be secured when installed to prevent accidental displacement by the wind, equipment, or personnel.
- All covers shall be color-coded or marked with the word "Hole" or "Cover" to provide warning of the hazard. (This does not apply to cast manhole covers or steel grates used on streets or roadways.)

4.11 Protection from Falling Objects

- Toeboards used as falling object protection shall be erected along the edge of the overhead working level for a distance sufficient to protect personnel below. Toeboards shall be able to withstand a 50-pound force outward or downward at any point on the toeboard.
- Toeboards shall be at least 3½ inches in height, and the gap between the working surface and bottom of the toeboard shall not be greater than ¼ inch. Toeboards shall be solid or have openings less than 1 inch in greatest dimension. Where tools, material, or equipment exceed the height of the toeboard, paneling or screening shall be added to protect personnel below.
- Guardrail systems used as falling object protection shall have openings small enough to prevent passage of potential falling objects.
- Falling object protection during overhand bricklaying work shall comply with 29 CFR 1926.502(j) (6).
- Canopies when used as falling object protection shall be strong enough to prevent collapse and to prevent penetration by any objects which may fall onto the canopy.

4.12 Fall Protection Plan

- Fall protection plans shall be used only when it is not feasible to use conventional fall protection equipment or when its use would create a greater hazard and only for leading edge work, precast concrete erection work, or residential construction work.
- The plan shall be prepared by a qualified person, must be site-specific, and must be kept up to date. All changes to the plan must be approved by a qualified person. A current, approved copy of the plan shall be maintained at the site.
- A competent person shall supervise implementation of the plan. The plan shall include the reasons why conventional fall protection systems are not feasible or would increase hazards to personnel.
- The plan shall identify alternative measures taken to reduce fall hazards that cannot be handled with conventional fall protection (e.g., use of scaffolds, ladders, elevating work platforms).
- The plan shall identify each area where conventional fall protection methods cannot be used.
- These areas shall be classified as CAZs. A safety monitoring system shall be implemented for the CAZs.
- The plan must identify by name or other unique identifier all personnel authorized to enter the CAZ. All other personnel shall be prohibited from entering.
- All falls and near-misses shall be investigated to evaluate the effectiveness of the plan.
- Deficiencies identified in the plan shall be corrected.

4.13 Personnel Training

- All personnel exposed to fall hazards shall be trained to recognize fall hazards and on ways to minimize the hazards.
- Each employee shall be trained by a competent person qualified in the following areas:
    - The nature of fall hazards in the work area
    - The correct procedures for installing, inspecting, and disassembling fall protection systems
    - The use and operation of fall protection systems to be used
    - Each employee's role in the safety monitoring system, if this system is used
    - The limitations on using mechanical equipment on low-slope roofing jobs
    - The correct procedures for handling and storing equipment and materials and installing overhead protection
    - Each employee's role in the fall protection plan, if this option is used
    - The OSHA fall protection standards

- The personnel training described above shall be certified in writing and include the name of the employee, the date of the training, and the signature of the employee and training instructor.
- Personnel suspected of not having the understanding or skills required shall be retrained. Other circumstances that require retraining include changes in the workplace that make earlier training obsolete; changes in the types of fall protection systems used; and observed inadequacies in how personnel use or understand fall protection systems.
- Personnel training certifications shall be maintained in the project file. Copies of certifications for personnel shall be forwarded to their Site Safety Officer, for entry into the recordkeeping system.

5.0 ATTACHMENTS

Attachment 1 - Fall Protection System Safety Checklist

Attachment 2 - Monthly Harness/Lanyard Inspection Checklist

6.0 REFERENCE

HS 132 Competent Persons

ATTACHMENT 1

FALL PROTECTION SYSTEM SAFETY CHECKLIST

Inspection- Fall Protection System Safety Checklist

Inspect all equipment visually before each use and periodically thereafter. The frequency of subsequent checks should be contingent upon the conditions the fall protection gear was utilized under field conditions. If defective conditions are found as described below, remove the item from service immediately, and get it properly repaired or destroyed. If conditions are found that are not included below, remove the item from service and contact safety engineer, distributor, or manufacturer for advice.

Webbing - Beginning at one end, bend a portion of the harness (6 to 8 inches) into a U-shape between your hands to reveal worn, cut, frayed, burnt, or damaged fibers. Check both sides of the harness and all straps along the entire length.

Buckle and D-ring attachment - Carefully check the buckles and D-rings attached to the webbing for excessive wear, cut, or torn fibers.

- *D-rings* - Check for rough or sharp edges, corrosion, burrs, cracks, dents, or distortion.
- *Tongue buckle* - Check for rough or sharp edges, corrosion, burrs, cracks, dents, or distortion. Buckle tongues should be free of distortion, move easily back and forth, and overlap the buckle frame. The frame roller should rotate freely.
- *Friction buckle* - Check for rough or sharp edges, corrosion, burrs, cracks, dents, or distortion. All portions of the buckle should be straight.
- *Sliding bar buckle* - Check for rough or sharp edges, corrosion, burrs, cracks, dents, or distortion. Sliding bar should move freely within the frame; ridges should be complete and not smooth. Carefully check the ends of the bar for distortion.
- *Grommets* - Check for rough or sharp edges, corrosion, burrs, cracks, dents, or distortion. Grommets must be tight.
- *Labels* - The manufacturer's labels should be on each piece of equipment and easily read. If missing, remove from service and contact purchasing, or distribution.
- *Rope* - Rope lanyards should be inspected by bending the rope into a U-shape between the hands and untwisting the rope slightly to check the inside fibers as well. This helps to reveal frayed, worn, cut, broken, burnt, or damaged fibers. Check all sides of each strand along the entire length of the lanyard.
- *Locking-type snap hooks* - All snap hooks must operate smoothly, and open and close completely. Check snap hook body for sharp edges, burrs, distortion, cracks, corroded, or pitted surfaces. Rivets should be checked for cracks, broken, or bent conditions. Gate and double-locking gate keepers should be free from distortion, bending, and seat properly against the snap hook nose and body. The gate keeper spring should be sufficient to completely and firmly close the snap hooks should freely rotate into the locked position when released.
- *Lanyard* - If any part of the danger label is showing or if there is any broken stitching, remove from service.
- *Anchorage points inspection* - Check all identified anchorage points for corrosion and adherence to minimum sizes and conditions.

Maintenance and Cleaning

- *Cleaning* - Nylon or polyester; if lanyards or harnesses need to be cleaned, they may be wiped down with a wet sponge, then washed with a soapy sponge using a brisk back-and-forth motion. Rinse completely with clear water and hang up to air dry away from exposure to high heat, steam, or long durations of sunlight.
- *Storage* - Lanyards or harnesses should be hung up or placed loosely (in a container) in a clean, dry area free from exposure to harmful fumes or corrosive agents.

Inspected by: _____ Date_____

This checklist is recommended as documentation for the annual inspection. It should be retained until it can be replaced by documentation of the nest annual inspection.

Attachment 2

Monthly Harness/Lanyard Inspection Checklist

Instructions

1. A qualified person as identified by the subcontractor must perform inspection of safety harnesses and lanyards.
2. All safety harnesses and lanyards used at Geosyntec-controlled project sites are required to be physically inspected prior to initial use.
3. Prior to initial use and monthly documentation of harness and lanyard inspections will be performed using this checklist.
4. Visual inspection of assigned harnesses and lanyards are to be performed prior to each use.
5. Any harness or lanyard not meeting the criteria below is to be tagged and removed from service. Attach additional checklists as necessary.

Safety Harness Manufacturer and Serial No.	Pass?	Safety Harness Manufacturer and Serial No.	Pass?
1.	□ yes □ no	6.	□ yes □ no
2.	□ yes □ no	7.	□ yes □ no
3.	□ yes □ no	8.	□ yes □ no
4.	□ yes □ no	9.	□ yes □ no
5.	□ yes □ no	10.	□ yes □ no

Webbing

1	Surface of webbing inspected for damage (hold webbing in an inverted U, inspecting webbing at 6-inch intervals?...	□ Yes □ No □ n/a
2	Frayed edges, broken fibers, pulled stitches, cuts or chemical damage observed?.....	□ Yes □ No □ n/a
3	Tufts of worn webbing observed on surface of harness or lanyard?.....	□ Yes □ No □ n/a
4	Harness or lanyard condition evaluated according to manufacturer's requirements?.....	□ Yes □ No □ n/a

Snaps and "D" Rings

1	Surfaces inspected for cracks and other defects?.....	□ Yes □ No □ n/a
2	Ring is not at a 90-degree angle and does not move independent of the body pad or saddle?.....	□ Yes □ No □ n/a
3	Tool loops and belt sewing inspected for broken or stretched loops?.....	□ Yes □ No □ n/a
4	Loop rivets inspected for thread separation or rotting on both sides of body pad belt?.....	□ Yes □ No □ n/a
5	Snaps inspected for hook and eye distortions, cracks, corrosion, or pitted surfaces?.....	□ Yes □ No □ n/a
6	Latch seated in snap nose properly and does not bind?.....	□ Yes □ No □ n/a

Buckles

1	Grommets inspected and found to be unbroken, snug-fitting, and free of distortions?.....	□ Yes □ No □ n/a
2	No additional holes punched or cut to accommodate inadequate fit?.....	□ Yes □ No □ n/a
3	Buckle inspected for distortions or sharp edges?.....	□ Yes □ No □ n/a
4	Equipment not equipped with grommets inspected for torn or elongated holes?.....	□ Yes □ No □ n/a
5	Outer and center bars of buckles are straight?.....	□ Yes □ No □ n/a
6	Equipped rollers turn freely on the frame of the buckle?.....	□ Yes □ No □ n/a
7	Rivets are tight and do not move are not bent and are flat against the material?.....	□ Yes □ No □ n/a
8	Rivets do not show signs of pitting, cracking, or chemical erosion?.....	□ Yes □ No □ n/a

Rope and Straps

1	Rope inspected from end to end for fuzzy, worn, broken, or cut fibers?.....	□ Yes □ No □ n/a
2	Rope diameter uniform throughout entire length?.....	□ Yes □ No □ n/a
3	Straps inspected for cut fibers or damaged stitches (hold strap in an inverted U, inspecting at 1-inch intervals)?.....	□ Yes □ No □ n/a
4	Friction buckle inspected for slippage, sharp edges, or excessive wear?.....	□ Yes □ No □ n/a

Project Information

Project Name:	
Project/Contract Number:	Project Manager:
Project Site Safety Officer:	Subcontractor's Qualified Person:

Completed by:

Print Name	Signature	Title	Date
_____	_____	_____	_____

HS 128 Ionizing and Nonionizing Radiation Safety

HS 128 IONIZING AND NONIONIZING RADIATION SAFETY

1.0 PURPOSE

Operations will meet or exceed all applicable federal, state, and local safety and health regulations pertaining to occupational and public exposure to ionizing and nonionizing radiation. This radiation safety procedure is intended to

- safely control personnel exposures to ionizing radiation while handling or using radioactive material (RAM) or working in any potential radiation areas;
- allow personnel to operate safely in areas where sources of nonionizing radiation are in use.
- meet all applicable regulatory requirements pertaining to RAM, ionizing radiation and nonionizing radiation exposure; and
- comply with RAM license requirements (for any RAM licenses).

The procedure is based on the following elements:

- Development of customized radiological safety solutions for the wide range of work activities where personnel may use/encounter RAM or become exposed to ionizing/nonionizing radiation
- Centralized management and evaluation of all worker dosimetry programs
- Employment of dose-equivalent minimization procedures, with the intent of minimizing both individual worker and collective group exposures, in accordance with recognized as-low-as-reasonably-achievable (ALARA) practices.

2.0 DEFINITIONS

As Low as Reasonably Achievable (ALARA): Limiting occupational dose equivalent exposures to the lowest level practical within each work operation (not merely below the maximum permissible exposure [MPE]).

Dose: A measure of the amount of energy deposited in a unit mass of material as the result of interaction with ionizing/nonionizing radiation. Ionizing radiation dose is measured in *rads* or *grays*, while nonionizing radiation exposure is measured in milliwatts per square centimeter (mw/cm^2).

Dose Equivalent: A measure of the relative biological effects of the energy deposited in a unit mass of material as the result of interaction with ionizing radiation. Dose equivalent is measured in Roentgen Equivalent Man (rems*)* or sieverts.

Maximum Permissible Exposure (MPE): The largest dose equivalent that may be received in a specified time period from occupational exposure to ionizing/nonionizing radiation.

Monitoring Period: A defined time period used for comparison between measured dose equivalent and any applicable MPE.

Radiation Area: Any location where the external dose equivalent rate exceeds 2 millirem per hour.

Radioactive Material (RAM): Any material with the following attributes:

- Contains one or more ionizing radiation-producing nuclides (radionuclides) present in concentrations greater than those specified in Schedule A of 10 CFR Part 30
- Contains naturally occurring radioactive materials (NORM) and/or technologically enhanced naturally occurring radioactive materials (TENORM) present in concentrations greater than those encountered naturally (regardless of the process and/or activity by which the concentration occurred)
- Exhibits a dose rate of 1 millirad per hour or greater at a distance of 1 foot (30 centimeters) from any surface and/or 5 millirads per hour or greater on any surface

Ionizing Radiation Protection Plan (RPP): A written set of procedures and requirements developed to ensure the safety of personnel handling RAM or assigned to work in known or suspected radiation areas.

Nonionizing Protection Plan (NIPP): A written set of procedures and requirements developed to ensure the safety of personnel exposed to nonionizing radiation.

Radiation Safety Officer (RSO): The person appointed to oversee and manage the specific radiation safety issues associated with a particular use or contact with RAM or exposure to ionizing radiation, in accordance with an established RPP.

3.0 RESPONSIBILITIES

3.1 Radiation Safety Manager (RSM)

The RSM will manage all health and safety issues related to ionizing radiation and/or radioactive materials. Duties of the RSM will include the following:

- Provide technical assistance with identifying and safely handling radioactive materials.
- Provide technical and procedural assistance in radiological safety when personnel enter any radiation area.
- Provide technical assistance with preparing any RAM license applications and renewals. Review and approve all applications prior to submittal.

- Select and manage a dosimetry service provider(s) and perform an annual review of all dosimetry program results.
- Prepare and approve all RPPs.
- Approve the appointment of each Radiation Safety Officer (RSO).
- Approve all ALARA Level 1 dose assessment investigations and lost dosimeter investigations performed by RSOs.
- Conduct and document all ALARA Level 2 dose assessment investigations.

3.2 Project Managers

Project Managers are responsible for ensuring that all radiation safety issues associated with their projects are properly addressed, and worker safety is ensured by developing appropriate radiological safety requirements and procedures. Project Manager's responsibilities include the following:

- Ensure that the presence of RAM, ionizing radiation sources, and radiation areas at project work site is identified (where reasonably possible) prior to commencing field activities, and that possible radiological hazards are assessed and controlled through development of an RPP.
- Ensure that employees working with RAM or ionizing radiation sources have received all necessary safety-related training, certifications, and licenses and are participating in the applicable dose assessment program (as required).

3.3 Radiation Safety Officers (RSO)

An RSO is appointed to oversee and manage the radiation safety issues associated with each RPP/NIPP. The following are responsibilities of the RSO:

- Manage all program/project radiation safety procedures as specified in the RPP/NIPP.
- Manage any RPP/NIPP-mandated dosimetry program, including distribution and collection of dosimeters, review of dosimetry results, and identification of ALARA Level 1 and Level 2 discrepancies.
- Conduct and document all ALARA Level 1 dose assessment investigations and lost dosimeter investigations.
- For RAM license RSOs, maintain administrative and operational compliance with all license conditions and requirements.

3.4 All Personnel

- Will not disturb or handle any RAM or work in any identified radiation area without appropriate training and safety procedures. Will work in accordance with all established RPP/NIPP requirements.

- Will immediately notify the Project Manager of the presence or suspected presence of previously unidentified RAM or ionizing/nonionizing radiation sources in the workplace and will cease all work activities involving potential exposure to ionizing/nonionizing radiation until further direction is received.

4.0 REQUIREMENTS

RPPs/NIPPs will be used as the basis for specifying the operation-specific implementation of these elements and will be prepared for all operations involving the potential for radiological exposure. The following operation-specific requirements pertain to activities where the on-site presence of ionizing radiation or RAM is identified, suspected, or recognized as a significant operational occurrence.

4.1 Radiological Investigation Activities

Where the presence of RAM is the subject of the planned work operations (e.g., facility characterization), the following requirements must be observed:

- The task-specific job safety analysis (JSA) must provide a specific analysis of the radiological exposure hazard for each task involving the disturbance, handling or contact with RAM and for all operations occurring within a radiation area.
- If any potential is identified for personnel radiological exposures to exceed 10% of the MPE then a RPP must be developed for the work activity and included as an attachment to the JSA.
- All personnel performing specific radiological investigation activities must complete radiological worker training and must participate in the RPP-specified radiological exposure assessment activities (e.g., dosimetry).

5.0 HAZWOPER ACTIVITIES

RAM may be present at HAZWOPER sites as a soil or groundwater contaminant. If such contamination is noted, the following requirements must be observed:

- The task-specific JSA must provide a specific analysis of the radiological exposure hazard for each task involving the disturbance or handling of RAM.
- If any potential is identified for personnel radiological exposures to exceed 10% of the MPE then a RPP must be developed for the work activity and included as a supplement to the HASP.
- If personnel may be exposed in excess of 10% of the MPE, they must complete radiological worker training and must participate in the RPP-specified radiological exposure assessment activities (e.g., dosimetry).

5.1 Demolition or Renovation Activities

Radiological materials may have been used in some buildings as part of previous operational activities, and if present, can represent a significant exposure hazard for personnel performing demolition and renovation activities. Accordingly, the following requirements will be observed:

- If past use of RAM is identified a thorough inspection, a sampling program will be completed throughout the demolition area to identify the presence of RAM.
- Where feasible, RAM will be removed prior to commencement of general work activities.
- The hazards of any remaining RAM will be analyzed and an RPP developed to prevent worker exposures in excess of the MPE (required) and reduced to the lowest level possible.
- A demolition or renovation notification must be filed with and approved by the United States Environmental Protection Agency (USEPA) and any local construction regulatory agencies prior to commencing demolition activities.
- If personnel may be exposed in excess of 10% of the MPE, they must complete radiological worker training and must participate in the RPP-specified radiological exposure assessment activities (e.g., dosimetry).

5.2 Other Activities

If the presence of RAM is identified or suspected at any work location and there is the potential for this material to become disturbed during planned work activities, then the following requirements must be observed:

- An exposure assessment will be completed for each task in which RAM may be disturbed.
- If any exposure assessment indicates the potential for personnel exposures to exceed the 10% of the MPE, then an RPP must be prepared to prevent personnel exposures in excess of the MPE (required) and reduced to the lowest level possible.
- If personnel may be exposed in excess of 10% of the MPE, they must complete radiological worker training and must participate in the RPP-specified radiological exposure assessment activities (e.g., dosimetry).
- NORM and TENORM consist of materials—usually industrial wastes or by-products enriched with radioactive elements found in the environment—such as uranium, thorium, and potassium and any of their decay products, such as radium and radon. These natural radioactive elements are present in very low concentrations in the earth's crust and are brought to the surface through human activities such as oil and gas exploration or mining and through natural processes like leakage of radon gas to the atmosphere or though dissolution in groundwater. Finally, another example of TENORM is coal ash handling from coal burning in power plants. Therefore, for work activities that take place at oil refineries, mining

projects, groundwater sampling near radon gas locations, and coal burning power plants, a special emphasis will be placed on the recognition, evaluation, and control measure(s) to limit potential exposures to NORM and TENORM.

- The RSO, under direction from the RSM, will be responsible for evaluating potential personnel exposures to NORM and TENORM by monitoring air using a personal dosimeter, film badge, or thermo luminescent dosimeter during activities. The RSO will compare these measurements, the annual limit on intake (ALI), and the derived air concentration (DAC), based on the dose average personnel working 2,000 hours a year may be exposed to. The current legal limit exposure in the US is 1 ALI, or 5 rems. A rem is a measurement of absorption of radiation on parts of the body over an extended period of time. A DAC is a concentration of alpha and beta particles that average personnel is exposed to for 2,000 hours of light work. If an employee is exposed to over 10% of an ALI, or 500 mREM, then the employee's dose will be documented in the staff's medical monitoring program under instructions with federal and state regulations. The employee's dose will be discussed with the Occupational Physician, and the employee will be trained and enrolled in a respiratory protection program per 29CFR1910.134. Affected personnel will also don Tyvek coveralls with nitrile gloves and booties and enhance their personal hygiene activities during the time in the NORM and/or TENORM work areas.
- Based on exposures levels, the RPP will be expanded to address appropriate control measure(s) to limit staff exposure to NORM and TENORM. Methods of protection against radiation exposure will establish time limits, distance requirements from the sources of radiation, and appropriate engineering control(s) in terms of shielding to reduce staff exposure (i.e., lead shielding). In addition, the RPP will discuss proper personal hygiene activities and enhanced decontamination protocol.

6.0 REFERENCE

HS 132 Competent Persons

HS 132 Competent Persons

HS 132 COMPETENT PERSONS

1.0 PURPOSE

This procedure outlines the process and minimum requirements necessary for classifying personnel as a competent person (CP) in one or more key health and safety (H&S) areas to include but not be limited to the following:

1. Confined Space Entry
2. Excavation
3. Heavy Equipment
4. Fall Protection
5. Lockout/Tagout (LO/TO)
6. Respiratory Protection
7. Radiation Monitoring
8. Nuclear Density Gauge (NDG)

The firm/company conducting the work associated with the H&S areas listed above is responsible for determining whether their employee is qualified to be the CP for assigned work. This procedure describes specialized training, which meets the minimum requirements for a person to qualify as a CP for a given activity or task. The Occupational Safety and Health Administration (OSHA) requires and the site enforces the requirement for CP to oversee or direct specific activities that are, by their nature, inherently dangerous unless conducted properly and with care.

2.0 DEFINITIONS

Competent Person (CP): A person capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to personnel, and who has authorization to take prompt corrective measures to eliminate the hazards.

3.0 SCOPE

The requirements included in this procedure are the minimum guidelines for a CP.

4.0 RESPONSIBILITIES

4.1 Management

The management of the firm/company engaged in the site work is responsible for obtaining, managing, and/or replacing CPs as applicable to operations in accordance with the requirements of this procedure. Prior to the performance of high-risk tasks, a CP who meets the requirements presented in this procedure will be identified to serve on-site as the supervising authority during all critical operations (see additional guidance in Section 5).

If a subcontractor activity requires a CP, as defined by OSHA and above, the subcontractor's management is responsible for ensuring that the CP, the procedure, and the H&S documentation for the activity are included in appropriate planning documents (JSA or equivalent).

Documentation for CPs will include the following:

- Confirm personnel training compliance and anniversary dates.
- Identify corrective actions when personnel fail to meet training requirements.
- Identify and conduct supplemental personnel training based on specific requirements.
- Ensure CP training requirements are reviewed with each employee, based upon current and anticipated job functions and past performance, on a routine basis. This will include, at a minimum, a review for each task during each JSA preparation and update.
- Identify additional personnel that require CP training based on this procedure.

The Corporate Safety Manager will document the competency of the designated persons based on the specific requirements in this procedure. They will determine competency and authorize the individual to serve as a CP in a specific area (e.g., excavation), which will be documented in the project files.

The Corporate Safety Manager is responsible for the following:

- Establishing CP training and experience requirements and communicating these requirements to line management
- Managing the overall implementation of this procedure
- Assessing compliance to the CP program per this procedure
- Providing technical assistance and support as requested
- Performing internal safety training classes as requested
- Establishing minimum CP requirements for tasks based on the specific task, applicable regulatory requirements, and operational considerations
- Reviewing and approving CP qualifications of personnel

- Authorizing personnel to serve as a CP, working with the Site Safety Officer (SSO) to document applicable training and certificates

4.2 Personnel

CPs will track his or her own training anniversary dates and arrange for appropriate refresher training at least 30 days prior to expiration of certification. Training records and certificates will be kept in the project files.

5.0 COMPETENT PERSON REQUIREMENTS

CP requirements depend on the job description and function. As stated in Section 4.0, it is the firm/company's management that is responsible to determine which of their employees meets CP qualifications and comply with policies and requirements.

5.1 Confined Space Entry

Prior to entering any confined space, a CP will be identified who meets the requirements identified in Section 5.1.3 to serve on-site during all confined space entry.

5.1.1 Confined Space Competent Person

The approved confined space CP is responsible for ensuring that all requirements for classification, confined space entry supervision and the entry itself meets the applicable federal, state, local, and/or regulatory standards (i.e., 29CFR1910.146) and HS 118 Confined Space Entry. The CP will identify and provide the following:

- Classification and inventory of applicable permit required confined space(s) in accordance with H&S
- Details concerning the potential hazards associated with the entry operation of non-permit-required and permit-required confined spaces
- Pre-entry preparation
- Required air monitoring equipment
- Required personal protective equipment (PPE) for confined space entry tasks
- Required emergency response/extraction equipment and emergency action planning
- Required ventilation procedures (as applicable)
- Required isolation procedures (as applicable)
- Required pre-entry monitoring procedures and applicable at-entry reclassification criteria
- Air monitoring procedures during entry (if reclassification has not occurred)

5.1.2 Minimum Requirements

The designated CP must meet the following qualifications:

- Completed an applicable regulatory Confined Space Attendant, Entrant, and Supervisor training course.
- Completed a review of the applicable procedure and any additional practices with the SSO.
- Demonstrated sufficient experience to the SSO and can identify existing and predictable hazards in a confined space

5.2 Excavation

Prior to conducting any excavation operation reaching a minimum depth of 6 feet below ground surface or as designated in the JSA, a CP will be identified who meets the requirements identified in Section 5.2.3, to serve on-site during all excavation operations.

5.2.1 Excavation Competent Person

The excavation CP is responsible for ensuring that all excavations conform to the applicable federal, state, and/or local requirements (i.e., 29 CFR 1926 Subpart P) and HS 402 Excavation and Trenching. The CP will identify existing and predictable hazards associated with the excavation will be authorized to direct work in a manner that mitigates those hazards. The following are the responsibilities of the excavation CP:

- Perform a daily inspection of the excavation using the Excavation Daily Inspection Checklist (or equivalent).
- Evaluate and verify the soil classification of the excavation.
- Evaluate and verify that the selected protective system is adequate for the planned operations.
- Oversee and evaluate the construction of the selected protective system.
- Ensure that operational safety practices conform to those identified in the applicable regulations and HS 402 Excavation and Trenching.
- Be on-site during all operations where personnel are working in or around an excavation that is four or more feet in depth or as required by the JSA.

5.2.2 Minimum Requirements

The designated CP must meet the following qualifications:

- Has completed an approved Excavation Competent Person training course
- Has completed OSHA 10-Hour Construction Course and/or applicable training program
- Has completed a review of the applicable H&S procedure (HS 402 Excavation and Trenching) along with the JSA
- Has demonstrated sufficient experience to identify existing and predictable hazards in the excavation surroundings

5.3 Heavy Equipment

A CP will be identified that meets the requirements identified in in this section, to serve on-site during all heavy equipment operations.

5.3.1 Heavy Equipment Competent Person

The approved heavy equipment CP is responsible for ensuring that all heavy equipment operations are performed safely in accordance with applicable federal, state, and local requirements (e.g., 29 CFR 1926.602, USACE EM 385-1-1 [as applicable]), the manufacturer's and rental agency (when applicable) requirements and recommendations. The heavy equipment CP will identify existing and predictable hazards involved in heavy equipment operations and will direct work in a manner to mitigate those hazards. The heavy equipment CP will perform the following:

- Initially verify equipment coming on-site is in safe operating condition and meets the manufacturer's recommendations to ensure safe operation (see checklist in Attachment 1).
- Correct any deficiencies identified during the inspection prior to using the machinery.
- Verify that a thorough inspection of the machinery was completed prior to using the machinery.
- Verify that a record of the dates and results of annual inspections for each machine and piece of equipment are available for review with the heavy equipment.
- Demonstrate the knowledge and ability to read and interpret the limitations (including total weight for intended work surface), load distribution, and general safety requirements applicable to the heavy equipment being operated.
- Be on-site during all operations involving heavy equipment, ensuring all assigned personnel are qualified to operate per this policy. Prequalification must be documented (see Attachment 1).
- Review JSA, etc., that are associated with site-specific operations and communicate to applicable field personnel.

5.3.2 Minimum Requirements

The designated CP must meet the following qualifications:

- Have documented experience supervising the use of heavy equipment
- Have a working knowledge and application of the industry standard hand signals for heavy equipment material and load handling
- Has completed a review of the applicable procedures, regulatory requirements, policies, and/or guidance with the SSO
- Demonstrate sufficient experience to identify existing and predictable hazards in the excavation surroundings

5.4 Fall Protection

Prior to self-performance of any work at or above 6 feet or as designated by the JSA, a CP will be identified who meets the requirements of applicable regulations and as identified in this section, to serve on-site when personnel are working at heights.

5.4.1 Fall Protection Competent Person Responsibilities

The approved fall protection CP is responsible for ensuring that all fall protection systems and measures conform to the applicable federal, state, and/or local standards (i.e., 29 CFR 1926.500 Subpart M) and other applicable procedures. The CP will identify existing and predictable hazards associated with the fall protection and will direct work in such a manner as to mitigate those hazards. The CP is responsible for the following:

- Ensure all personnel working above six feet are trained in fall hazards and the PPE of fall protection.
- Perform inspections of safety nets, guard rails and fall arrest equipment per the applicable federal, state, and/or local regulations (e.g., 29 CFR 1926 Subpart M).
- Verify the development of a fall protection plan for each task and/or fall protection equipment.
- Identify potential fall hazards and implement the appropriate fall arrest systems to protect personnel.

5.4.2 Fall Protection CP Minimum Requirements

The designated fall protection CP must meet the following qualifications:

- Have documented experience supervising work requiring fall protection
- Have working knowledge and application of fall restraining systems and equipment
- Completed a review of the applicable standard operation procedure with a safety professional
- Demonstrated sufficient experience to identify and control existing and predictable fall hazards
- Completed Fall Hazard and Fall Protection Equipment training
- Reviewed and understand fall protection plan
- Reviewed and interpreted applicable fall protection standards

5.5 Lockout/Tagout

LO/TO is the process used to prevent injuries by controlling energy sources such as electrical power, hydraulic fluid under pressure, compressed air, steam, energy stored in springs, potential energy from suspended parts, or any other source that may cause unexpected movement when it

is necessary to perform work on the system. LO/TO also applies to similar functions performed on systems containing hazardous materials.

The Corporate Safety Manager and/or designated LO/TO CP will assess the competency of all potential LO/TO CPs based on whether they meet the specific requirements in this section. Applicable training certificates and documentation of experience will be kept in the project files.

A CP who meets the requirements identified in this section will be designated to serve on-site when LO/TO is required.

5.5.1 LO/TO CP

The approved LO/TO CP is responsible for ensuring that all LO/TOs conform to the applicable federal, state, and/or local requirements (i.e., CFR 1910.147 and/or equivalent standards (e.g., U.S. Army Corps of Engineers EM 385-1-1). The LO/TO CP will identify existing and predictable hazards associated with energy sources and will be authorized to direct work to mitigate those hazards prior to performing work on or around the subject system. The LO/TO CP will be responsible for the following:

- Inspect all LO/TOs before the start of the work shift and be sure the required tags, locks, group locking systems, or other LO/TO protection is in place at the designated LO/TO points. Subcontractors LO/TO CP must perform the same.
- Identify existing and potential energy-release hazards in their surroundings or working conditions.
- Know and develop procedures for the applying and removing locking or tagging equipment in accordance with applicable rules and requirements.
- Know the specifics (e.g., design, process, energy sources) associated with the equipment being locked or tagged.

5.5.2 Minimum Requirements of LO/TO CP

The designated LO/TO CP must meet the following qualifications:

- Have documented experience supervising work requiring LO/TO protection equivalent to the work being performed
- Have working knowledge of LO/TO systems and equipment
- Have experience in the applying and removing LO/TO systems, including developing equipment-specific procedures
- Have completed a LO/TO-specific training course

5.6 Respiratory Protection

Prior to donning respiratory protection or upgrading to a higher level of RP (e.g., Level C, B or A) and as designated in the JSA, a respiratory protection CP will be identified, who meets the requirements identified in this section.

5.6.1 Respiratory Protection Competent Person

A designated respiratory protection CP is responsible for ensuring that all activities requiring respiratory protection related conform to applicable federal, state, and/or local standards (i.e., 29 CFR 1910.134). The respiratory protection CP will identify existing and predictable issues and concerns associated with selecting respiratory protection equipment (e.g., respirators, filters), filter replacement schedules, fit testing, use, decontamination, and repair. The respiratory protection CP will be responsible for the following:

- Ensure that personnel who may need to wear and use respiratory protection are trained, fit tested, and medically monitored to use the intended equipment in accordance with the Respiratory Protection Program (RPP). Training and experience will be documented in project files.
- Perform inspections of respirators and associated equipment per the Respiratory Protection Program (e.g., air purifying respirators [APRs], self-contained breathing apparatus [SCBAs], compressed gases).
- Identify and communicate upgrade and downgrade criteria for the respiratory protection selected. This information is discussed with the SSO and documented in task-specific JSAs.
- Understand the different types and classifications of respiratory protection equipment available to personnel, limitations of each and optimum selection based on site- or facility-specific conditions.

5.6.2 Minimum Requirements

The designated respiratory protection CP must meet the following qualifications:

- Have documented experience supervising the selection, fit testing, use, decontamination, filter replacement scheduling, inspection and repair of respiratory protection equipment being used for the task
- Has completed a review and can communicate the requirements of the Respiratory Protection Program, including fit testing equipment and procedures and minimum documentation procedures
- Has demonstrated sufficient experience to identify and control existing and predictable respiratory system hazards
- Have a working knowledge of applicable respiratory protection regulations (i.e., 29 CFR 1910.134 or equivalent)

5.7 Radiation and NDG Monitoring

Please refer to the specific H&S programs for radiation protection and NDG for training, and field experience requirements for CPs for that activity.

6.0 ATTACHMENTS

Attachment 1 – Heavy Equipment Operator Qualification Checklist

Attachment 2 – Certification of Supervised Field Experience

Attachment 1

Heavy Equipment Operator Qualification Checklist

- ❒ Demonstrate knowledge of rules for general job safety.
- ❒ Demonstrate knowledge of hand signals.
- ❒ Demonstrate safety precautions for loading and moving equipment.
- ❒ Discuss effective communications during equipment operations.
- ❒ Aware of his or her surroundings when moving, seat belt use etc.
- ❒ Demonstrate knowledge of terms associated with basic principles of engine/transmission.
- ❒ Demonstrate knowledge of preventive maintenance procedures.
- ❒ Check items on a daily (or shift) checklist.
- ❒ Demonstrate safe service positions.
- ❒ Demonstrate the ability to lubricate the equipment.
- ❒ Demonstrate knowledge of safety rules concerning fueling the equipment and flammable liquids.
- ❒ Demonstrate knowledge of terms associated with grade work, purposes of stakes, identify information given on stakes, and demonstrate correct use of stakes.
- ❒ Demonstrate knowledge of terms associated with soil slopes.
- ❒ Demonstrate safety rules pertaining to care and maintenance of batteries.
- ❒ Demonstrate the ability to service an air cleaner.
- ❒ Demonstrate understanding of pre-dig/subsurface excavation requirements (subsurface utility clearance).
- ❒ Demonstrate the ability to operate excavator in unstable soil using mats.
- ❒ Demonstrate the ability to operate excavator on a grade using benching technique(s).
- ❒ Demonstrate the ability to operate excavator using trench box.
- ❒ Demonstrate the ability to dig a straight-line ditch and load a haul truck.
- ❒ Demonstrate proper equipment entry and exit.

Remarks: _____

_____

_____

Heavy Equipment Competent Person
Name (print):_____
Signature:_____
Date:

Qualified Operator
Name (print):_____
Signature: _____
Date:

Attachment 2

Certification of Supervised Field Experience

The following is applicable:

( ) Competency for operating the equipment was verified (through observation and additional means if applicable) for the individual as the individual has had previous training/experience.

( ) On-the-job training occurred for operating the equipment and competency verified.

DATE	JOB FUNCTION	DATE	JOB FUNCTION
1. __/__/__	Rubber-Tire Backhoe/Loader Operator	13. __/__/__	Front-end Loader
2. __/__/__	Off-Road Truck Driver	14.__/__/__	_____Foreman
3. __/__/__	Batch Plant Operator	15. __/__/__	Fuel Truck Driver
4. __/__/__	Motor Grader Operator	16. __/__/__	Hydraulic Crane Operator
5. __/__/__	Cable Crane Operator	17. __/__/__	Liner Technician
6. __/__/__	Compactor Operator	18. __/__/__	Oiler
7. __/__/__	Dozer Operator	19. __/__/__	Pick-up or Van Driver
8. __/__/__	Drill Helper	20. __/__/__	_____ Operator
9. __/__/__	Drill Operator	21. __/__/__	Truck Driver
10. __/__/__	Hydraulic Excavator Operator	22. __/__/__	Welding/Burning
11. __/__/__	Drill Rig Operator	23. __/__/__	
12. __/__/__	Forklift Operator (per 29 CFR 1910.178 or equivalent) Make Model	24. __/__/__	Three (3) days of supervised field experience in accordance with 29 CFR 1910.120(e) (3) (i), or equivalent.

_____ _____

Printed Name & Signature of Employee Printed Name & Signature of Supervisor

_____ _____

Date Date

Note: This form is not all inclusive; use of other H&S SOPs may apply.

HS 134 Compressed Gases

Health & Safety Procedures

Procedure: HS 134
Date: February 2018
Revision: 1

HS 134 COMPRESSED GASES

1.0 PURPOSE

The following requirements pertain to all uses of compressed gases at the Site.

2.0 GENERAL USE OF COMPRESSED AIR OR GASES

- Compressed air or other compressed gases in operating pressures exceeding 10 pounds per square inch gauge (psig) are not to be used to blow dirt, chips, or dust from clothing while it is being worn. Compressed air used for other types of cleaning (other than clothing/personnel) is to be limited to 30 psig.
- The use of blown compressed air is to be controlled, and proper personal protective equipment or safeguards will be used to protect against the possibility of eye injury to the operator or other persons.
- Compressed air or gases are not to be used to empty containers of liquids in cases where the operating pressure can exceed the safe working pressure of the container.
- Compressed gases are not to be used to elevate or otherwise transfer any hazardous substance from one container to another unless the containers are designed to withstand the operating gas pressure with a safety factor of at least four.

3.0 COMPRESSED GASES (CYLINDERS)

- Cylinders are not to be used unless they bear Department of Transportation (DOT) markings showing that they have been tested as required by DOT regulations.
- Pressurized gas cylinders are hazardous materials. You must be trained and certified to transport them on roads or ship them.
- Cylinders must never be dropped, struck, or permitted to strike each other violently. Cylinders may be moved by tilting and rolling them on their bottom edges.
- Valve protection caps must always be kept on cylinders when they are being moved or stored and until ready for use.
- Cylinder valves are to be kept closed except when gas is being used or when connected to a permanent manifold. Valves of empty cylinders must be closed.
- Cylinders must never be used as rollers or supports or for any purpose other than carrying gas.

- Cylinders of compressed gas shall be stored in areas where they are protected from external heat sources such as flame impingement, intense radiant heat, electric arc, or high-temperature steam lines.
- Cylinders are to be stored in an assigned area; full and empty cylinders are to be stored separately. Stored fuel gases and oxygen cylinders are to be separated by at least 20 feet or by a fire wall at least 5 feet high that has a fire-resistance rating of at least one-half hour.
- Oxygen, nitrogen, helium, or Freon cylinders may be stored or transported either in an upright or horizontal position. Acetylene cylinders must always be kept in an upright position. All horizontally placed cylinders are to be secured by chocks or ties to prevent rolling.
- Cylinders are to be secured to a fixed object by chain or equivalent fastening device whenever they are placed in an upright position. The protective cap is not to be removed or the cylinder valve opened until the cylinder is secured.
- Repair of leaks must never be attempted on a pressurized system. System pressure should be reduced to atmospheric pressure as rapidly as possible.
- To identify the gas content, compressed gas cylinders must be legibly marked with either the chemical or the trade name of the gas. Such marking should be stenciling, stamping, or labeling, and must not be readily removable. Whenever practical, the marking is to be located on the shoulder of the cylinder. Positive identification of the gas in any cylinder is required before connecting cylinders for use.
- Compressed gas cylinders in portable service are to be conveyed by suitable trucks, to which they are securely fastened. All gas cylinders in service must be securely held in substantial racks or secured to other rigid structures so they will not fall or be knocked over.
- Gas cylinders moved by hoist must be handled in suitable cradles or skip boxes. Any slings used for this purpose must be specifically designed for that cylinder handling.
- Cylinders must not be placed where they might form part of an electrical circuit.
- Transfer of acetylene from one cylinder to another, or mixing of gases in a cylinder, is prohibited.
- Oxygen cylinders are never to be stored near
    - highly combustible materials, especially oil and grease;
    - reserve stocks of acetylene or other fuel gas cylinders; or
    - any other substance likely to cause or accelerate fire
- Compressed oxygen is never to be used
    - as breathing air;
    - to purge pipelines, tanks, or any confined area;
    - to supply a head-pressure tank;

- in pneumatic tools;
- in oil preheating burners;
- to start internal combustion engines;
- for ventilation;
- for cleaning clothing; or
- in any other way as a substitute for compressed air.

- Use of a cylinder's contents for purposes other than those intended by the supplier is prohibited.

4.0 COMPRESSED GASES (CALIBRATION CYLINDERS)

Personnel are required to use calibration gases under pressure in cylinders to maintain and keep monitoring equipment (e.g., photoionization detector [PID], flame ionization detector [FID]) to operating properly. The issues regarding this type of compressed gas involve proper storage and disposal. The information below provides general guidelines. Please contact the SSO, if needed, prior to final handling and disposal of calibration gases.

- When you obtain the calibration gas from the manufacturer, confirm there is a material safety data sheet (MSDS) and/or safety data sheet (SDS) included in the shipment. Most MSDS/SDS will provide information on proper disposal (e.g., vendor will take them back at no cost; recycle option(s), disposal with vendor).

Once gas cylinders for nonflammable and nontoxic gases (e.g., only hazard for shipping is the pressure) are empty (e.g., at atmospheric pressure), they are no longer a DOT hazardous material. They are also not a United States Environmental Protection Agency (USEPA) hazardous waste (e.g., not ignitable, reactive, corrosive, toxic). If the MSDS/SDS does not provide adequate disposal information, disposal may be subject to local waste and/or recycling restrictions.

HS 203 Stop Work Authority

HS 203 STOP-WORK AUTHORITY

1.0 PURPOSE

This procedure recognizes the obligation and responsibility of all workers to stop work without reprimand if they believe, based on reasonable and practicable grounds, that an imminent health and safety (H&S) hazard or risk is likely to endanger themselves, another person, or property. This Procedure also establishes administrative procedures associated with processing and closure of a formal Stop Work Order and returning to work.

2.0 SCOPE AND APPLICABILITY

This procedure applies to all workers on the site operating under this procedure and the associated parent health and safety plan (HASP). Contractors working under their own HASP may use this or a similar procedure as required by their HASP.

This Procedure is not intended to require a formal work stoppage in place of normal and typical discourse among workers to discuss workplace hazards and develop appropriate safe work practices and hazard control measures, or to preclude other avenues for submitting a written request for corrective action; it is intended to ensure that workers are not exposed to imminent or undue hazards, and provide recourse to workers when normal/typical means of resolution through collaboration are not effective or available.

Circumstances for which a valid Stop Work Order may be submitted, include, but are not limited to the following:

- An individual is exposed to an imminent or undue work-related danger or risk
- An imminent or undue threat to the environment, facilities, or property.
- Continuing work or equipment usage will result in exposure of individuals to an imminent hazard or significant damage or rework.
- A task is executed improperly or is substantively and critically out of compliance with specifications, or where a work area or work practices are not managed or maintained in a safe and healthy manner.

Stop-work authority applies to all work locations, employees, and subcontractors. All personnel are authorized to stop work if there is an identified unsafe condition with an imminent hazard to which a worker will be exposed.

The regulatory basis for workers' right to refuse work that represents an imminent hazard in North America includes but may not be limited to the following:

- U.S. OSHAct, Part 11(c), and regulation 29 CFR Part 1977.12 “Exercise of any Right Afforded by the [OSH]Act, Section (b)(2)

A Stop Work Order issued by a worker under this H&S Procedure will be without prejudice to any other legal or contractual rights of the company or contractors involved.

Informal stop-work interventions to correct minor conditions (e.g., to remind workers to put on their hard hats, safety glasses, parking of Company vehicles) do not require formal notification, and do not constitute grounds for a formal Stop Work Order, per this Procedure. However, other administrative steps may be taken outside of this procedure, if needed, to correct recurring disregard for H&S or other procedures.

3.0 DEFINITIONS

Imminent Danger: Imminent danger, also termed an “imminent risk” or “imminent hazard” or “undue risk or hazard,” is a danger that is not normal or typical for a work task. An impending or threatening hazard related to a condition, practice, piece of equipment, or tool, which represents, if left uncorrected, a likelihood of worker exposure to an undue risk or hazard, with the potential for serious injury to any person or critical/catastrophic environmental impact or property damage.

Stop Work Order: A stop work order is a formal action, documented in Attachment 1 Stop Work Order, initiated by a worker in which he or she refuses to perform work that represents an imminent or undue hazard or risk that places the worker or others in danger of harm. A stop work order may be issued for a specific task, practice, tool or piece of equipment, area within a work area, or an entire work area or project site, to the extent necessary to protect affected workers from exposure to an imminent or undue hazard or risk.

4.0 PROCEDURES

This section defines procedures for issuing and processing a Stop Work Order, reviewing the Stop Work Order for merit, and abating the hazard and issuing the approval to resume work.

4.1 Issuance of a Stop Work Order

To submit or issue a Stop Work Order, a worker shall first and immediately notify the worker’s Project Manager of the work stoppage and the reason(s) for the action, followed as soon as possible by filling out Section 1 “Submittal of a Stop Work Order” of the written “Stop Work Order.” Next, the worker must submit the Stop Work Order by hard copy or electronically to the Project Manager. The Project Manager will then take the following actions:

- Immediately notify the Anniston PCB Site Manager and the individual’s Corporate Safety Manager that a Stop Work Order has been issued and forward copies of the written Stop Work Order.
- Immediately notify senior management directly associated with the organization/project team responsible for the work subject to the Stop Work Order.

- Investigate and take action (as considered appropriate for the specific circumstance) in coordination with operational managers and legal departments, as needed, to mitigate the hazard and/or prevent other workers from performing the work tasks that are the subject of the work stoppage and/or seeking additional information about the circumstance of the Stop Work Order.
- Follow the procedures in this document regarding documenting and resolving the work stoppage.

Where a subcontractor exercises his or her right to stop or refuse work, he or she shall do so by notifying his or her Project Manager. The subcontractor's Project Manager will notify the Anniston PCB Site Manager. Subsequent activities will be generally in accordance with the principals outlined in this Procedure, with engagement/notification of legal or contracts departments as appropriate for the circumstance.

4.2 Review of Stop Work Order for Merit/Justification

A formal Stop Work Order may be reviewed for merit by senior managers associated with the work. It is the responsibility of the review team to ensure the following:

- The employee's right to a safe workplace and right to refuse work of undue or imminent hazard are protected under the occupational health and safety regulations and laws applicable in the jurisdiction where the work is located.
- A determination is made as to the merit of the Stop Work Order or lack thereof based on current standards of care and due diligence and in accordance with laws and regulations applicable in the jurisdiction where the work is located.

The review team findings will be documented in Section 2 "Review for Merit," of the Stop Work Order, with information including substantive findings, corrective measures to eliminate/control the subject hazard(s) of the Stop Work Order, names of reviewers, relevant dates, and next steps.

Where the review team has determined that the Stop Work Order has merit and is validated, subsequent actions will be in accordance with Section 4.3. Where the review team contests or refutes the validity of the Stop Work Order, subsequent actions will be resolved by senior managers.

The review team will take no action that interferes with the employee's rights to any subsequent valid/legal course of action taken in response to the findings of the review team.

4.3 Abating the Hazard and Resumption of Work

Actions taken to abate the subject hazard(s) addressed in Sections 1 and 2 of the Stop Work Order and for the resumption of work after hazard abatement, shall be documented in Section 3 of the Stop Work Order, "Resolution of Stop Work Order and Resumption of Work."

In response to a valid Stop Work Order, workers affected by the order will be instructed on the corrective actions and preventative measures to be taken in a timely manner. Additional requirements associated with corrective action(s) will be compiled in an updated Job Safety Analysis (JSA) and discussed with affected personnel.

The Stop Work Order will remain in effect until the responsible organization resolves the problem(s), implements corrective measures, and brings the work area(s) to satisfactory conformance with established H&S requirements and eliminates worker exposures to imminent or undue hazards or risk. Approval by the Anniston PCB Site Manager and the Project Manager are required before work can be resumed.

Temporarily stabilizing or halting an imminent danger condition or practice is acceptable, if it is deemed acceptable to be left unattended/unresolved and if no other person will be exposed to the imminent or undue hazard. Work associated with the affected area or operation will not resume unless all corrective actions identified in the applicable Stop Work Order have been completed and it is safe to resume work.

If the responsible organization fails to provide resolution or if at any time their acts or failure to act cause substantial harm or imminent danger to the H&S of workers, the public, the environment, or property, the organization and responsible individuals will be considered in violation of this Procedure.

5.0 DOCUMENTATION/RECORDS

Documentation of stop-work actions will include the fully executed Stop Work Order (Attachment 1) and other relevant information and documentation generated during execution and closure of the Order. The documentation will be maintained in the project files and by Corporate Departments as deemed necessary or appropriate. Copies of the executed/closed written Stop Work Order will be provided to the individual(s) initiating the work stoppage as well as other members of the affected organization(s), including, as appropriate, the Project Manager and the Anniston PCB Site Manager.

6.0 PROTECTION FROM REPRISALS, DISCIPLINARY ACTIONS

The Anniston PCB Site project prohibits and will not tolerate any form of reprisal, reprimand, retribution, intimidation, or other form of discipline directed at any individual for exercising their right to refuse unsafe work subject to the provisions delineated in this Procedure. Individuals failing to follow the directive of a Stop Work Order or who reprimand a person in any way for exercising his or her right to refuse hazardous work may be removed from the project.

7.0 TRAINING

Workers will be provided training on the right to refuse unsafe work (work stoppage) and on the procedures for refusing unsafe work as part of site-specific safety briefing. Training on this topic will also be provided periodically during other appropriate worker training, learning, and communication opportunities, such as the following:

- Periodic H&S training programs

- Safety moments and safety alerts
- Project-specific safety orientations and daily tailgate meetings
- Shared/published lessons learned resulting from incident reports and investigations

8.0 ATTACHMENTS

Attachment 1 – Stop Work Order

ATTACHMENT 1

STOP WORK ORDER

STOP WORK ORDER

Section 1 – Issuance of a Stop Work Order		
Project Name:	**Project No:**	**Date:**
Project Manager:	**Time:**	
Submitted/Reported by:		
Summary of Hazardous Conditions, Relevant Factors:		
Section 2 – Review for Merit		
Findings; Next Steps:		
Signatures of Review Team:		
Section 3 – Resolution of Stop Work Order, Resumption of Work		
Actions Taken:		
Signatures Confirming Closure of Stop Work Order:		

Title:	**Print Name:**	**Signature:**	**Date:**
Project Manager			
Anniston PCB Site Manager			
Party Issuing Stop Work Order:			
Subcontractor Supervisor: (if applicable)			
Others:			

HS 210 Walking–Working Surfaces Protection

HS 210 WALKING‑WORKING SURFACES PROTECTION

1.0 PURPOSE

Personnel are required to maintain a workplace free of hazards (e.g., hazards associated with tripping, falling, or overhead objects because of uneven walking surfaces, holes, or debris). This procedure addresses requirements for walking surfaces, work platforms, and stairway safety.

2.0 SCOPE

This procedure applies to all activities at the site.

3.0 PROCEDURES

3.1 General Requirements

- Ensure that worksites are clean, sanitary, and orderly; work surfaces are kept dry; and appropriate means are taken to assure the surfaces are slip-resistant.
- Clean all spilled liquids and hazardous materials, including blood and other potentially infectious materials, immediately and according to proper procedures.
- Illuminate all work areas adequately; do not conduct field operations before sunrise or after sunset unless adequate lighting is provided.
- Cover pits and floor openings or otherwise guard.
- Keep aisles and passageways clear and marked as appropriate.
- Cover wet surfaces with nonslip materials, mats.
- Repair holes in the floor, sidewalk, or other walking surface properly; cover or otherwise make them safe by warning signs or diverting traffic.
- Store materials or equipment in such a way that sharp projections will not interfere with the walkway.
- Use signs and/or caution tape to identify any changes of direction or elevations.
- Arrange aisles or walkways that pass near moving or operating machinery, welding operations, or similar operations should so personnel will not be subjected to potential hazards.
- Provide adequate headroom for the entire length of any aisle or walkway.

3.2 Standard Specifications

If guardrail or protective covers are required for tripping and falling hazards, the devices below will be installed in accordance with the accompanying specifications.

3.2.1 Standard Protective Railings

A standard railing will consist of top rail, intermediate rail, toeboard, and posts, and will have a vertical height of approximately 42–45 inches from upper surface of top rail to floor, platform runway, or ramp level. The top rail will have a smooth surface throughout the length of the railing. The intermediate rail will be halfway between the top rail and the floor, platform, runway, or ramp. The ends of the rail will not overhang the terminal posts except where such overhang does not constitute a projection hazard. Minimum requirements for standard railing under various types of construction are specified in the following:

3.2.2 Stairways and Railings

- All stairways that have two risers or more will have handrails.
- All stairways should be at least 22 inches wide.
- All stairs should have landing platforms not less than 30 inches in the direction of travel and extend 22 inches in width at every 12 feet or less of vertical rise.
- Step risers on stairs should be uniform from top to bottom and steps should be slip-resistant.
- Stairway handrails should have at least 3 inches of clearance between the handrails and the wall or surface they are mounted on.
- Stairway handrails should be able to withstand a load of 200 pounds, applied within 2 inches of the top edge in any downward or outward direction.
- Where stairs or stairways exit directly into any area where vehicles may be operated, provide adequate barriers and warnings to prevent personnel from stepping into the path of traffic.

3.2.3 Standard Toeboards

- A standard toeboard will be 4 inches minimum in vertical height from its top edge to the level of the floor, platform, runway, or ramp. It will be securely fastened in place and have not more than 1/4-inch clearance above floor level. It may be made of any substantial material, either solid or with openings not over 1 inch in greatest dimension.
- Where material is piled to such height that a standard toeboard does not provide protection, paneling or screening from the edge of the standard toeboard to the intermediate rail or to the top rail will be provided.

3.2.4 Floor Opening Covers

Floor opening covers will be of any material that meets the following strength requirements:

- Conduits, trenches, and manhole covers and their supports, when located in roadways and vehicular aisles, will be designed to carry a truck rear-axle load of at least two times the maximum intended load.
- The floor opening cover will be able to support the maximum intended load and so installed as to prevent accidental displacement.

All floor opening covers will be properly marked and secured.

3.2.5 Skylight Openings

Skylight openings that create a falling hazard will be either guarded with a standard railing or covered.

3.2.6 Wall Opening Protection

- Barriers will be of such construction and mounting that, when in place at the opening, the barrier can withstand a load of at least 200 pounds applied in any direction (except upward), with a minimum of deflection at any point on the top rail or corresponding member.
- Screens will be of such construction and mounting that they can withstand a load of at least 200 pounds applied horizontally at any point on the near side of the screen.

3.3 Flooring Requirements

- The derrick or erection floor will be solidly planked or decked over its entire surface except for access openings.
- Planking or decking of equivalent strength will be of proper thickness to carry the working load.
- Planking will be not less than 2 inches thick, full-size and undressed, and will be laid tight and secured to prevent movement.

3.4 Guarding of Floor Openings and Floor Holes

Floor openings will be guarded by standard railings with standard toeboard or cover, as specified in this section. In general, a railing will be provided on all exposed sides, except at entrances to stairways.

3.4.1 Guarding of Wall Openings

Wall openings, from which there is a drop of more than 4 feet, and whose bottom is less than 3 feet above the working surface, will be guarded.

3.4.2 Guarding of Open-Sided Floors, Platforms and Runways

Every open-sided floor or platform 4 feet or more above adjacent floor or ground level will be guarded by a standard railing or the equivalent on all open sides, except where there is an

entrance to a ramp, stairway, or fixed ladder. The railing will be provided with a standard toeboard to facilitate the passage of persons beneath the open sides or wherever there is moving machinery, or equipment producing hazardous falling materials.

3.5 Barrier Identification Tape

Barrier identification tape is strictly prohibited from being used for any form of personnel fall protection. Barricade tape around an excavation can be used for short term (24 hours); after this period, physical barriers are required.

- Yellow barricade tape will be used for caution/warning.
- Red barricade tape will be used for danger-- do not enter.

Once the barricaded area is free of the hazard(s), the tape will be removed and properly discarded.

3.6 Other (Environmental)

- A means of access (e.g., ladder, stairway, ramp) shall be provided for all points of access where a break of elevation of 16 inches or more exists.
- Means of access shall be kept clear to allow free passage for personnel.
- When the top of an open tank or vat that contains a hazardous substance is less than 36 inches above the floor or platform, then a barrier (e.g., guard rails) shall be erected to at least 36 inches in height.
- Personnel will be aware of uneven ground surfaces and site terrain, and every effort should be made to ensure excavated areas are leveled to reduce slip/trip/fall hazards.
- Debris should be managed in such a way to reduce tripping hazards.
- Good housekeeping practices should always be observed. Trash, debris, and construction materials should always be kept neat and orderly.
- Hazards that cannot be abated should be identified (e.g., large rocks, sumps, pits, voids) and demarcated to alert personnel to the specific tripping hazard.

4.0 FALL PROTECTION

All areas that are 6 feet or more above an adjacent floor or ground level shall be protected with a guardrail or perimeter cable, unless it is not feasible. In such circumstances, the use of fall protection is mandatory. Refer to HS 120 Fall Protection Program, for additional guidance.

5.0 REFERENCES

HS 120 Fall Protection Program

HS 402 Excavation and Trenching

HS 306 Working on or near Water and Ice

Health & Safety Procedures

Procedure: HS 306
Date: February 2018
Revision: 1

HS 306 WORKING ON OR NEAR WATER AND ICE

1.0 PURPOSE

The procedure establishes the minimum safety requirements for personnel performing sampling, investigations, and support while working on or near water or ice.

2.0 SCOPE

The following guidelines shall be implemented during all work activities that require personnel to work on, near, or over water or ice (e.g., rivers, lakes, ponds, retention basins, unguarded clarifiers, containment systems). These guidelines must be communicated to all personnel performing operations near or on water or ice.

3.0 PROCEDURE

3.1 General Requirements

3.1.1 Training

- All boat operators are required to complete a boating safety course and have experience operating a motorized vessel within the past two years.
- Boat safety training and education may be obtained through a recognized outside source such as the United States (US) Coast Guard Auxiliary.
- Proof of course completion from one of these outside sources must be kept on record. Furthermore, the user may be required to demonstrate boat handling skills.
- Before departure, each passenger not holding certification must be briefed by the certified operator or captain as to the safety equipment and procedures onboard the vessel.

3.1.2 Personal Protective Equipment

Operations on or near water may require some or all of the following:

- US Coast Guard-approved personal flotation device (PFD), sized and adjusted to the wearer, shall be worn by all when there is a danger of drowning. To be immediately effective in an overboard situation, the straps must be buckled. Vests shall be equipped with a rescue lights as reflectors during night, low light, and heavy weather conditions.
- Foul weather gear (during wet conditions, as necessary)
- Gloves of appropriate material

- Waders (only in shallow waters)
- Rescue line
- Ring buoys

3.1.3 Transfer between Boats

Transferring between boats and barges can be dangerous, particularly in rough weather. Be extremely cautious every time you make a transfer. Never become complacent. Getting caught between vessels, even in calm seas, can be deadly.

3.1.4 Deck Hazards

Deck hazards are everywhere on vessels and barges. Rigging, wire, fittings, welding, lead, and stored materials are just some of the many tripping and snagging hazards. Also watch for slippery decks, particularly when muddy, wet, layered with ice, or near fuel and lubricant spills. This is especially hazardous during rolling deck conditions.

3.1.5 Overhead Hazards

- Overhead hazards are always a threat. Never stand under a hanging load, empty bucket hook, or crane boom.
- Crane operators are not allowed to swing loads over other personnel.
- Stand clear of tag lines and other rigging suspended from above.

3.1.6 Noise

High noise areas should be avoided. Ear plugs and/or muffs will be worn in high noise areas that must be entered or where engineering controls are unable to reduce exposure.

3.2 Diving

No personnel shall be allowed to “wet dive” or “one atmosphere dive” in any vehicle, bell, or suit without being authorized by the Corporate Safety Manager. This includes self-contained underwater breathing apparatus (SCUBA) and hard hat diving.

3.2.1 Weather

- Full account will be given to existing weather conditions and forecast during planning for specific project operations.
- Boat handling will cease when winds reach sustained speed of 20 knots. Launching, recovering, or otherwise handling a boat is unsafe when wind speed reaches 20 knots.

4.0 WORKING NEAR WATER/ICE

If work must be performed on, near, or over water, the following requirements must be followed:

- Work must be performed in accordance with the buddy system.

- Personnel working over or near water, where the danger of drowning exists, shall be provided with an approved PFD (Section 3.1.2). Type of PFD should be selected by the water conditions present. Prior to and after each use, the PFDs shall be inspected for defects, which would alter their strength or buoyancy. Defective units shall not be used and must be replaced.
- Ring buoys with at least 90 feet of line shall be provided and readily available for emergency rescue operations. Distance between ring buoys shall not exceed 200 feet.
- At least one lifesaving skiff/boat shall be immediately available at locations where personnel are working over or adjacent to water.
- Whenever possible, minimize the risk to personnel by avoiding the use of watercraft and instead performing work from the shore/bank. For situations where ice exists, reschedule work to periods of warmer temperatures, when ice is not an issue.
- Avoid wearing waders or hip boots, in deeper waters. They are cumbersome and may encourage workers to go deeper into water than is safe. Only use this apparel in shallow waters (e.g., creek beds).
- If personnel have the potential to get stuck in mud or sediment, air injection equipment designed to free workers feet/legs may need to be available on-site. If a worker does get stuck, do not struggle as this causes deeper sinking. Personnel should not be permitted to access areas where this hazard exists, especially in locations containing tidal water flow.
- Use a pole to probe ahead to assess water depths and stability of shoreline terrain.
- Take special care on slippery rocks around lakeshores, riverbanks and creeks. Always look ahead at the ground when walking around the water's edge.
- If sampling near or in flowing water environments, be aware of slippery or steep banks and fast currents. If the current is fast or the water looks deeper than knee height, do not enter the water. If you must enter the water, a restraining system must be worn and secured to the bank for retrieval.

If work must be performed on ice, the following requirements must be followed:

- Work must be performed in accordance with the buddy system with rescue communications available.
- Do not walk or work on ice unless there is no other way of performing work.
- Whenever possible, use alternate methods. Have personnel use a flat-bottomed boat with ropes (or equivalent) tied to each end and handled by personnel on the berm, bank, or shore.
- Only walk on ice that is fully frozen, not cracked or brittle, that will support the necessary weight of personnel and associated equipment.
- PFDs shall be inspected and worn in accordance with the requirements listed above.

- Personnel must wear a restraining system (a lifeline attached to the front of a full-body harness) and stay close enough to the edge to make it possible for the attendant to pull the individual back on the ice.
- Personnel must have available (on their person) equipment that can be used to partially penetrate the ice to help pull them out of the water and back up on the ice (equipment is available with capped ends that can be worn safely until needed).

Gauging the strength of ice is very difficult. There is no such thing as 100% safe ice.

- Never walk or drive on cloudy ice.
- Only go on clear, thick ice.
- Spring ice may not be safe.
- The thickness of ice is never consistent; it will be flat on top, but not on the bottom.
- Snow on ice acts as an insulator; it makes ice warmer and weaker.
- Extreme cold snaps will weaken the ice.
- Ice formed over running water (rivers and streams) is more dangerous than ice formed over standing water (lakes and ponds).

General ice thickness guidelines from the various resources outline the following (new, clear ice only):

- Less than 2 inches – not safe; stay off
- 4 inches and thicker - probably safe for walking and ice fishing on foot
- 5 inches and thicker - probably safe for all terrain vehicles or snowmobiling
- 8 to 12 inches and thicker - probably safe for small cars or light pickups
- 12 to 15 inches and thicker - probably safe for medium trucks

4.1 Water and Ice Safety Equipment

The following is safety equipment required to support work on, over, or near water or ice:

- Cell phones (or equivalent) capable of contacting emergency services
- Approved PFD
- Ring buoys with at least 90 feet of line
- Full-body harness with restraining line
- Lifesaving skiff/boat (as needed)
- Air injection equipment designed to free workers feet and legs (if necessary)
- Poles to probe for assessment purposes
- Capped ice picks, spikes, etc.

5.0 ATTACHMENTS

Attachment 1 – Boat Loading and Launching Checklist

Attachment 2 – Daily Float Plan

Attachment 1

Boat Launching and Loading Checklist

Boat Launching and Loading Checklist			
Date:	**Employee's Name**		
Title: Safe Boat Unloading, Operating, and Loading			
		JSA Followed (check)	
Subject 1: Personal Protective Equipment Required		**Yes**	**No**
A. Safety Glasses			
B. Safety Toe Boots			
C. Hard Hats (required for work, but not necessarily while driving or riding boat(s) to and from work site)			
D. Personal Floatation Devices			
Subject 2: Vehicle to Trailer Hook-up		**Yes**	**No**
PREJOB TASKS: A. Boat may be equipped with a transom drain plug. Make sure this plug is in place and tight.			
B. Inspect the bottom of the boat and make note of all fittings below the waterline. Ensure none are loose or broken.			
C. Check boat, motor and trailer for vegetation and remove before launching boat into water.			
D. Check gas and oil tanks and lines for leaks, frays, crack, and breaks.			
PROCEDURE: A. Check behind the vehicle to make sure that no one or any obstacles are between vehicle and trailer.			
B. Back Vehicle toward trailer using approximate center of vehicle to align trailer hitch on vehicle with tongue of trailer. Put vehicle in park and set park brakes, and then check for vehicle ball and trailer hitch alignment. Adjust vehicle to desired distance. Put vehicle in park, set parking brake, and shut off engine. (Assistant can help align if available)			
C. (1) Check vehicle tube receiver making sure pin and cotter pin are installed through receiver tube.			
(2) Check ball on receiver for tightness			
(3) Check ball size (normally stamped on trailer hitch).			
(4) Match ball size on vehicle receiver with trailer hitch. Failure to use correct ball size can cause trailer to come unhitched from vehicle			
D. Remove safety pin from latch on trailer hitch. Latch must be in up position. Slowly lower trailer hitch toward ball by turning jack handle to lower trailer tongue while aligning ball and hitch. When trailer hitch has bottomed on the ball, push latch down; install the safety pin through the latch.			
NOTE: Jack can be used to raise and lower tongue to get the latch to lock. E. Attach hooks on safety chains from trailer to vehicle hitch where holes are provided, or to vehicle frame. Chains should be crossed (XpedX) from trailer tongue to vehicle frame.			
F. Plug trailer lights to vehicle. Ensure all lights are working properly.			
G. Attach brake cable (if unit is equipped).			
H. Pull pin on jack frame and pivot jack to tow position letting pin return into hole on frame to lock jack.			
I. Check that a safety pin or a lock is in place			

Subject 2: Vehicle to Trailer Hook-Up (continued)	Yes	No
J. Check that a safety pin or a lock is in place.		
K. Check boat and trailer.		
L. Complete trailer inspection. Ensure that all equipment is present, in good condition, and safe to operate.		
M. Remove wheel chocks before moving boat trailer.		
Subject 3: Boat Launching	**Yes**	**No**
A. Complete launch preparations while boat is in staging area.		
(1) Remove safety tie downs from boat to trailer		
(2) Drop motor into vertical position. Remove support, if equipped.		
(3) Install transom drain plug.		
(4) Unhook trailer wires.		
(5) Be sure a bow line is fastened to boat.		
B. Be sure all required equipment and safety devices are aboard.		
(1) If there are two people, launch boat with one person on boat (life jacket must be worn). Driver will slowly back the boat trailer down the ramp until the boat can easily float off the trailer. When backing onto the ramp, back to the left if possible. This gives the driver better launching visibility. Driver will place vehicle in park, put on parking brake, and keep one foot on brake pedal. When boat is floating in the water, remove vehicle/trailer from launch ramp and park in the parking area. Set parking brake before leaving vehicle.		
(2) If one person is launching, after boat is in water, place vehicle in park, set parking brake and shut off engine. Place chocks under wheels of towing vehicle. Enter boat (life jacket must be worn), remove from trailer, dock at pier or on shoreline, and tie off boat. Remove truck from launch ramp to parking area.		
C. When boat is in the water, immediately inspect the motor for leakage. And if oil or gas leak is detected, attempt to contain the release if possible, without risking bodily harm. Return the boat to the trailer and contact the area supervisor or the project sponsor. If there is immediate danger, evacuate the area.		
D. Check the boat for any through-the-hull fittings for sign of leakage into the boat. If any leaks are noted, the boat should be removed from the water immediately for repair.		
Subject 4: Boat Rules and Regulations	**Yes**	**No**
A. Each occupant (personnel, contractors, and visitors) aboard any watercraft while on water, including boats and barges with standard handrails, must wear an approved personal flotation device.		
(1) Prior to and after each use, the personal flotation devise shall be inspected for defects that might alter their strength or buoyancy. Defective units shall not be used.		
B. Each boat, including pontoon boats, shall have onboard the following items:		
(1) A minimum of one Type IV life jacket (or equivalent)		
(2) One life ring buoy with 90 feet of line (rope attached)		
(3) A sound device for alerting or alarm, whistle, or horn		
(4) A minimum of one paddle		
(5) One site radio, if applicable. Radio should be tested to be sure it is working properly.		
(6) Minimum of one approved fire extinguisher and that fire extinguisher has current monthly inspection.		
C. Approved hard hats, safety shoes, and eye protection are required while working aboard any craft. Not necessary when traveling aboard a boat.		
Boating and Water Safety Rules – MISCELLANEOUS INFORMATION		

Attachment 2

Daily Float Plan

DAILY FLOAT PLAN				**Expected Weather Conditions:**	
Name	**Role**	**Phone No.**	**Signature**	**Description:**	
				Air Temp:	
				Water Temp:	
				High Tide:	
				Low Tide:	
Shore Support Personnel				**Sunrise:**	
Name	**Role**	**Phone No.**	**Signature**	**Sunset:**	
				Boat Information	
				Model:	
				Registration:	
				Captain:	
				Model:	
				Registration:	
				Captain:	

Trip Itinerary	**Work Areas:**

Health and safety meeting prior to starting work. Topics:

General Timeline

Specialized Equipment Required

Safety Equipment
_x_ As specified in JSA

HS 312 Water Transportation Safety

HS 312 WATER TRANSPORTATION SAFETY

1.0 PURPOSE

The purpose of this program is to provide guidance and information aimed at performing work over water in a safe and controlled manner and ensure that the potential hazards posed by water transportation operations are communicated.

The following governmental organizations are responsible for regulating water transportation safety in their respective jurisdictions:

- United States – United States Coast Guard (USCG) under the U.S. Department of Homeland Security.

2.0 SCOPE

Water transportation includes supply ships, tugboats, ferries, barges, and other watercraft operating on oceans, lakes, rivers, canals, and harbors that may be engaged in the performance of project-related activities. Activities and work practices normally associated with water transportation or performing work over water are within the scope of this procedure and are noted in HS 306 Working on or near Water and Ice (e.g., safety considerations, personal protective equipment [PPE], deck hazards).

3.0 DEFINITIONS

Commercial Boat: Any boat used as a common carrier of passengers or property, operating on a regular schedule; any vessel propelled by electric or mechanical power carrying passengers for hire.

Capacity Plate: A metal plaque located near the operator′s position and/or near the transom of the vessel indicating the maximum weight capacity and/or the maximum number of people that vessel can safely carry. On outboard powerboats the capacity plate will also state the maximum horsepower rating for that vessel.

Cowl: A hooded opening used for ventilation

Flame Arrestor: A safety device that prevents an exhaust backfire from causing an explosion.

Master: person trained in and responsible for the navigation of a vessel.

Maximum Capacity: The maximum number of people or pounds designated by the USCG on the vessel's capacity plate.

The Offshore Vessel Inspection Database (OVID): Developed in response to a request from its members to provide a database of offshore inspections broadly following the format of a ship inspection report (SIRE).

Personal Floatation Device (PFD): USCG-Approved Type I life preserver.

4.0 PROCEDURE

4.1 Working over Water Guidance

Prior to the commencement of work, the Field Supervisor, Platform Foreman, or Lead Operator and the boat crew (to include staff, hereinafter called the boat staff) will conduct a job safety analysis (JSA) prior to beginning the work with those individuals noted on the Permit to Work and all personnel designated to work over water.

1. When applicable, the boat staff should discuss where the rescue boat is to be located. The preferred location is the immediate facility. A secondary option is an adjacent facility that can provide an adequate rescue response. An adequate response evaluation will be conducted as part of the rescue. The rescue drill will consist of a ring buoy deployment from the facility where the over water work is to be performed and a successful retrieval from the facility performing the rescue activities.
2. The intent of the work, work duration, and communications procedures will be discussed as well as other safety issues with the boat staff. All safety issues will be resolved to the satisfaction of the boat staff prior to initiating any over-water work.
3. The boat staff will be required to notify the destination locations and adjacent facilities each day that over-water work will occur and the scheduled duration. When over-water work ceases, previously notified parties will be contacted.
4. A lead supervisor will be designated prior to the initiation of work. This person shall also act as the communications person.
5. Personnel shall not work alone in situations where a drowning hazard exists.
6. Personnel shall wear a Coast Guard Approved PFD. If appropriate, workers will maintain 100% tie-off at all times while outside the confines of standard handrail areas or outside the confines of certified scaffolding.

4.1.1 Drills and General Requirements

1. Man-overboard drill
    a. Will be conducted and the rescue boat run, launched, and retrieved prior to commencement of work, where the permit-named rescue boat operator or the boat crane operator has not performed a rescue drill within the last 30 days.
    b. When conditions are less than perfect to conduct a rescue drill, then boat staff shall lower the boat till the prop is in the water, start and briefly run the motor, and simulate releasing the boat before returning the boat on deck. Drills should not be undertaken where this presents an unacceptable risk to the rescue crew.
2. Abandon-ship and man-overboard drills and training

a. The master shall conduct sufficient drills and give sufficient instructions to make sure that all crew members are familiar with their duties during emergencies that necessitate abandoning ship or the recovery of persons who have fallen overboard.

b. The following must be included in each abandon-ship drill:

    i. Summoning the crew to report to assigned stations and prepare for assigned duties

    ii. Summoning passengers on a vessel on an overnight voyage to muster stations or embarkation stations and ensuring that they are made aware of how the order to abandon ship will be given

    iii. Checking that life jackets are correctly donned

    iv. Operating any davits used for launching life rafts

c. Each abandon-ship drill must, as far as practicable, be conducted as if there were an actual emergency.

d. Each rescue boat required in accordance with § 180.210 of this chapter must be launched with its assigned crew aboard and maneuvered in the water as if during an actual man overboard situation:

    i. Once each month, if reasonable and practicable

    ii. At least once within a three-month period before the vessel gets underway with passengers

e. Onboard training in the use of davit-launched life rafts must take place at intervals of not more than three months on a vessel with a davit-launched life raft.

f. Abandon-ship and man-overboard drills and training shall be logged or otherwise documented for review by the USCG upon request. The drill entry shall include the following information:

    i. Date of the drill and training

    ii. General description of the drill scenario and training topics

3. Drills for rescuing a worker suspended in a safety harness may be required as part of the JSA and/or Permit to Work procedures.

    a. The rescue of a worker who has fallen and is being suspended in his or her safety harness needs to be undertaken as quickly as possible.

    b. If no elevating work platform is available for rescue, the general rescue procedures should cover the following at a minimum:

        i. If victim is not conscious or cannot reliably help with his or her own rescue, at least two rescuers may be needed.

        ii. If victim is suspended from a lifeline, where possible, move the suspended victim to an area that can be safely reached by the ladder(s).

iii. If victim is suspended directly from his or her lanyard or from a lifeline, securely attach a separate lowering line to the victim's harness.

iv. Other rescuers should lower the victim while he or she is being guided by the rescuer on the ladder.

v. Once the victim has been brought to a safe location, administer first aid, and treat the person for suspension trauma and any other injuries.

vi. Arrange for transport to nearest hospital.

4. Working over water shall not occur during the following conditions:
    a. When weather conditions deteriorate to a point that the rescue boat cannot respond or there are express concerns over wave height, sea state, or poor visibility. Working over water will occur only during daylight hours.
    b. When winter ice is in the immediate vicinity of the facility.
    c. If the regular helicopter is not available for medical transfer.
        i. Coordination must be made to ensure availability of Medevac or USCG helicopters when regular helicopters are not available.
        ii. This coordination includes contacting Medevac or USGC helicopters and documenting the contact time as well as names and phone numbers of individuals to call in case of emergency.
        iii. Once alternative helicopter coverage for medical transfer has been confirmed (Medevac or USCG), over-water work may resume.
5. Rescue boat requirements
    a. A rescue boat must be available prior to beginning over-water work. The boat may be in the water or it may be situated on the deck, ready for launch by crane or davit/winch device. An evacuation capsule may not be used as the primary rescue boat.
    b. Prior to beginning any work over water and prior to the requisite man-overboard drill, the crane operator and rescue boat operator will confer and stage the rescue boat in an advantageous location to perform the quickest rescue.
    c. The crane does not have to be attached to the rescue boat concurrent to the over-water work, but the rescue boat as well as the crane shall have appropriate rigging attached. The crane being used will be dedicated to no other job concurrent with the over-water work.
        i. The crane operator and the rescue boat captain shall monitor wind, weather, and sea conditions routinely throughout the duration of the job and shut down work activities accordingly.
        ii. The crane operator shall stage the personnel transfer basket, as appropriate, if a contracted vessel is in the water and is used as the rescue boat.

iii. The crane operator shall have a radio at hand while all over-water work is underway.

iv. Upon being notified via radio by the man watch/attendant that an individual has fallen overboard, he shall immediately sound a general alarm and make a man-overboard notification to all platform/facility personnel via the facility PA system.

d. The rescue boat crew will include a boat operator and one or two assistants depending on the size of boat.

e. In conjunction with rescue boat staging, the rescue boat crew will ensure that the fuel tank is at least 75% full, stage emergency response/rescue equipment and a hand-held radio at/in the rescue boat as appropriate. Personal floatation suits or exposure suits will be staged aboard for the rescue boat crew.

6. Man watch/attendant and man-overboard requirements

a. Duties for individuals performing man watch/attendant:

i. In all cases of over-water work, a person shall be posted at the job site to handle emergencies.

ii. This person will be in visual and/or verbal communication with all harnessed/tethered personnel at all times.

iii. The man watch/attendant shall not leave this location for any reason while over-water work is in progress.

iv. If the man watch/attendant must leave, the tied-off personnel shall return to the confines of grating/handrail areas or within the confines of certified scaffolding, fully erected with standard handrails, until the man watch returns.

v. The man watch/attendant shall be equipped with a radio and a ring buoy with a minimum of 90 feet of lanyard.

vi. In the event of a man overboard, immediately summon assistance via radio and throw a life ring in near the man overboard. If possible, the life ring should be thrown behind the person in the water, so that it can be pulled forward toward the person.

vii. Do not lose sight of the man overboard and direct rescue personnel via radio to the location of the fall victim.

viii. shall know the location of the nearest medical facility.

ix. The man watch/attendant shall not be assigned any duties that interfere with the intended responsibilities, nor participate in over-water work.

b. The lead supervisor shall maintain radio communications with the man watch/attendant while all over-water work is underway. Prior to beginning work over water, the following phone numbers will be posted or otherwise made readily available to the crew.

i. Departure location

ii. Destination/rig supply vessel and/or of adjacent facilities

c. Upon hearing announcement of a man overboard the lead supervisor shall immediately call 911, as well as the other noted locations in an effort to seek assistance. She/he shall remain cognizant of tidal current direction throughout the day. Tidal current direction shall be conveyed to the potential responders.

d. In the event of a man overboard, all over-water work shall cease, and all tied-off personnel shall return to the confines of a handrail area or within the confines of approved scaffolding.

7. Vessel requirements

   a. All commercial boats must be commercially registered and inspected with a certified/licensed operator.

   b. The bow numbers issued to every vessel shall be displayed on the forward half of the hull and meet specific numbering requirements regarding size, color, and placement.

   c. The licensing examination consists of a written test and, if the vessel involved is 34 feet or greater, an on-the-water examination of the applicant's piloting skills will also be administered.

   d. It is the responsibility of the commercial operator to ensure that all safety requirements are met prior to operation.

   e. The operator is required to obey the boating laws and rules regarding navigation, operation, and safety equipment, while underway.

   f. The operator or owner of a commercial vessel shall report all boating accidents involving $2,000 or more in total damage or personal injury or death immediately to the regulating agency.

   g. The operator of a commercial vessel must have his or her commercial operator's license in his or her possession at all times when operating a commercial vessel.

8. Safety Equipment (Refer to HS 306 Working on or near Water and Ice) must be in good condition and inspected prior to use.

9. Personal flotation devices

   Every commercial vessel shall carry a USCG-approved Type I PFD that is in serviceable condition for each person on board. The device must be of an appropriate size for the intended wearer, and the device must be readily accessible. Children 12 years of age or younger must wear a PFD at all times unless the vessel meets special requirements for exemption from this rule. Additionally, unless the vessel never carries children, the vessel shall be equipped with a number of such approved devices suitable for children, equal to at least 10 percent of the total number of persons carried. A USCG-approved Type IV device must also be provided on vessels that are 16 feet or greater in length.

10. Sound-producing devices

    Powerboats must have a horn or whistle that meets sound-producing device requirements. Vessels 26 feet or longer must also have a bell. When boats are running in the fog, mist, etc., and cannot see each other, the operators shall sound on blast of a whistle or horn at intervals not exceeding two minutes.

11. Fire extinguishers

    a. A fire extinguisher is required on all power boats. Fire extinguishers must be approved by the USCG and/or Underwriters Laboratory.
    b. Powerboats less than 26 feet long must have at least a B1 extinguisher.
    c. Powerboats 26 feet to less than 40 feet long must have at least a size B-2 extinguisher or two B-1 extinguishers.
    d. Powerboats 40 feet long or longer must have a B-2 extinguisher and a B-1 extinguisher or three B-1 fire extinguishers.
    e. All B-I and B-II extinguishers should be securely mounted in brackets in locations where they are readily accessible.

12. Navigation lights

    Navigation lights are to be displayed between sunset and sunrise. All boats are to show at the forward part of the boat a red light to port and a green light to starboard. Each colored light must show from dead ahead to two points towards the stern of the beam or 112.5 degrees of an arc. In addition to the forward colored running lights, an all-around 360-degree white light must be aft and higher than the colored running lights. Boats 26 feet and longer may mount the running lights on the sides of the super structure and must display a white masthead light showing in the direction of the red and green lights combined. Colored lights must be visible for one mile on a clear night and white lights must be visible for two miles on a clear night.

13. Flame arrestors

    The carburetor(s) of every engine installed on motorboats which use gasoline as a fuel, except outboard motors, shall be fitted with a device which has demonstrated its ability to arrest backfires and which has been accepted and approved by the USCG.

14. Ventilation

    All boats with an enclosed engine compartment that use gasoline or other flammable fuel shall be provided with at least two cowls or their equivalent for the purpose of properly and efficiently ventilating the bilge, engine, and fuel tank compartments.

    All commercial vessels powered by gasoline or other flammable fuel in which the motors or fuel tanks are enclosed shall have a forced draft blower for ventilating the bilge, engine, and fuel tank compartments in order to remove flammable or explosive gases.

15. Paddles

All commercial vessels less than 26 feet long must be equipped with two paddles in case of engine failure.

16. Fuel shut off

All commercial vessels equipped with fuel tanks having a capacity of six gallons or more shall be equipped with a functional shut-off valve having a securely attached handle that is readily accessible for use.

17. Drugs and alcohol

No person may operate a vessel while under the influence of intoxicating liquor or drugs or any combination thereof. Additionally, no person may operate a vessel while knowingly having in his possession, or in any part of the vessel, a controlled drug.

18. Operation

The following information is a selection of boating rules and regulations. This information is to aid the commercial boat license applicant in understanding many of the rules and laws which he or she is required to abide by. Operators of passenger boats, while underway, shall not allow unauthorized persons to interfere with the navigation of such boats.

All boat staff of a power boat must be completely inside the boat and are not allowed to be seated on the gunwales or transom or to straddle the bow.

While going greater than headway speed all boats must keep at least 150 feet from other boats, rafts, swim areas, docks, or shore. Headway speed is defined as the slowest speed at which it is still possible to maintain steering or six miles per hour.

Boats meeting each other head on or bow to bow should turn to the right, a port to port passage, unless a starboard to starboard passage is obviously safe and understood by both operators and the courses of both boats are not meeting head on.

When two or more boats come together in a crossing situation, the boat to the right showing its port side or red light has the right of way.

Sailboats, canoes, and rowboats should always be given the right of way with respect to powerboats.

19. Navigation

One category is regulatory markers which indicate general information and dangerous and restricted areas. Regulatory markers are easily identified by their color. They are white with black lettering and have orange bands. The second category is comprised of the aids to navigation. These buoys and markers direct the

boater to a direction towards a cardinal point (north, south, east, or west) of a compass.

It is unlawful to tie a boat to a buoy, marker or other aid to navigation, as doing so may pull the marker off its designated location and direct traffic into a navigational hazard.

20. Personal protective equipment

Operating on water, personnel are exposed to the sun, wind, and weather. In addition to the PFD, wear layers of clothing to regulate temperature and sun exposure. Provide adequate supplies of sunscreen and bottled water. Sturdy work boots protect your feet from getting crushed by heavy gear. A slip-resistant sole helps you stay on your feet while working on a wet and moving surface. Consider a heel on the boot to assist with climbing ladders. Heavy/durable waterproof canvas gloves will provide support during handling of equipment and machinery.

21. Slips, trips, and falls

Slips, trips, and falls can be serious on a boat. Besides a scrape, sprain, or fracture from a fall, you could end up overboard. Keep work areas clear of standing water. Maintain slip-resistant surfaces with special marine coatings and good housekeeping practices. When you work near the sides of the boat, stay behind the rail or clip into a sturdy, rated anchor point on the boat using a lifeline or fall protection.

22. Weather

Follow safe boating practices and monitor weather conditions before and during your trip. Know what type of weather conditions and extremes your vessel (and its cargo) can handle.

23. Navigation

Keep updated charts and know the operating and navigational rules of the waters you work. Know the boat and its capacity and load rating; load and store materials in a compliant and safe manner.

24. Maintenance

Boat staff should perform equipment inspections and maintenance on schedule, so you don’t break down. Carry adequate fuel, tools, and spare parts onboard in case of a breakdown or emergency.

25. Communications

A float plan will be developed as a part of the JSA so someone onshore knows where you will be and when you are expected back. A daily float plan can be found as Attachment 2 in the HS 306 Working on or near Water and Ice procedure.

26. Emergency equipment

    Be sure the correct number of life vests, immersion suits, rafts, etc., are onboard. Keep them accessible and in good working order. Carry enough food, water, and first aid supplies to sustain all of the passengers in an emergency. Personnel should know the emergency procedures and the location of emergency supplies. Learn about hypothermia and how to maximize your water survival and rescue.

27. Vessel safety check program (VSC)

    The VSC decal attests to the fact that the boat complies with federal and state requirements. Operations in potentially challenging waters or hazardous conditions may justify knowledge, skills, and additional safety equipment that far exceed these minimum legal requirements.

5.0 REFERENCES

This working over water guidance meets the requirements of OSHA CFR 29, 1926.106(a), 1926.106(b), 1926.106(b), 1926106(d).

Reference is made to the Code of Federal Regulations (CFR) Title 46 Shipping 46 CFR 185.520 - Abandon Ship and Man Overboard Drills and Training.

6.0 SUPPORTING DOCUMENTS

Note that in addition to the minimum federal requirements stated here, the vessel's owner/operator may be required to comply with other regulations and/or laws specific to the state in which their recreational vessel is registered or operated. To ensure compliance with state boating laws, boaters should contact the appropriate boating agency in their area for additional information.

HS 401 Manual Materials Handling/Back Injury Prevention

Health & Safety Procedures

Procedure: HS 401
Date: February 2018
Revision: 1

HS 401 MANUAL MATERIALS HANDLING/BACK INJURY PREVENTION

This procedure applies to all site activities.

1.0 PURPOSE

Personnel will observe the procedures below when performing manual handling in excess of 20 pounds (lbs)/9 kilograms (kg) Personnel shall consider engineering or work practice controls or assistance from other personnel when lifting more than 49 lbs/22 kg.

2.0 INTRODUCTION

Manual materials handling (MMH) means moving or handling things by lifting, lowering, pushing, pulling, carrying, holding, or restraining. Improper MMH can result in cuts, pinches, crushing, and serious back, abdomen, arm, and leg muscle and joint injury. Even light objects, lifted improperly, can contribute to injury, causing cuts and muscle injuries.

The level of hazard associated with MMH work depends on what is being handled, what the task is, and what the conditions are at the workplace. The following are specifics for personnel to consider regarding MMH:

- Is the load too heavy for the task that you are doing?
- Is the load located too high or low for a safe lift?
- Is the load too big or does it have a shape that makes it difficult to handle?
- Is the load wet, slippery, or have sharp edges that make it difficult to grasp?
- Is the load unstable or can it shift its center of gravity because it contains items that can move or flow (e.g., a partially filled drum or concrete in a wheelbarrow)?
- Is the load too big to let you see where you are putting your feet?

The task can make MMH hazardous if personnel

- uses poor lifting techniques (e.g., lifting too fast, too often, or too long; lifting with back bent or while twisting or reaching too far; lifting while sitting or kneeling);
- has to move material over long distances;
- will not take appropriate rest breaks (insufficient recovery time); or
- performs a combination of different handling tasks together (e.g. lifting, carrying and lowering).

The site conditions can also contribute to hazards of MMH if any of the following are present:

- Uneven, wet, icy, slippery, unsteady, etc. walking surfaces
- Different floor levels or walking surfaces
- Poor housekeeping that causes slip, trip, and fall hazards
- Inadequate lighting
- Work being performed at a fast pace
- Restricted movement because of clothing or PPE or because the space is small or posture is constrained

3.0 GENERAL REQUIREMENTS

Mechanical equipment or assistance such as dollies, carts, come-alongs, or rollers are to be used whenever possible. Mechanical assistance must be of proper size, have wheels sized for the terrain, and be designed to prevent pinching or undue stress on wrists. Objects to be moved must be secured to prevent falling and properly balanced to prevent tipping. The following guidance will be observed:

- Before performing the lift:
  - Check to see if mechanical aids such as hoists, lift trucks, dollies, or wheelbarrows are available.
  - Be sure you can lift the load without overexerting yourself, and get help with heavy or awkward loads. With loads over 49 lbs., consider using mechanical aids or get assistance from other personnel.
  - Be sure that the load is free to move.
  - Check that the planned location of the load is free of obstacles and debris.
  - Be sure that the path to the planned location of the load is clear. Grease, oil, water, litter, and debris can cause slips and falls.
  - Decide on the proper technique. Particular handling and lifting techniques are needed for different kinds of loads or materials (for example, compact loads, small bags, large sacks, drums, barrels, cylinders, sheet materials like metal or glass).
  - Do not lift unless you are sure you can handle the load safely.
- General tips for lifting:
  - Prepare for the lift by warming up the muscles.
  - Stand close to the load and face the way you intend to move.
  - Use a wide stance to gain balance.
  - Be sure you have a good grip on the load.
  - Keep arms straight.
  - Tighten abdominal muscles.
  - Tuck chin into the chest.

    - Initiate the lift with body weight.
    - Lift the load as close to the body as possible.
    - Lift smoothly without jerking.
    - Avoid twisting and side bending while lifting.
- Engineering controls:
    - Material handling tasks should be designed to minimize the weight, range of motion, and frequency of the activity.
    - Alter the task to eliminate the hazardous motion and/or change the position of the object in relation to the body (e.g., adjusting the height of a pallet or shelf).
    - Work methods and stations should be designed to minimize the distance between the person lifting and the object being handled.
    - High-strength push-pull requirements are undesirable, but pushing is better than pulling. Material handling equipment should be easy to move, with handles that can be easily grasped in an upright posture.
    - Workbench or workstation configurations can force people to bend over.
    - Corrections should emphasize adjustments necessary for the person to remain in a relaxed upright stance or fully supported, seated posture. Bending the upper body and spine to reach into a bin or container is highly undesirable. The bins should be elevated, tilted or equipped with collapsible sides to improve access.
    - Repetitive or sustained twisting, stretching, or leaning to one side are undesirable. Corrections could include repositioning bins and moving personnel closer to parts and conveyors.
    - Store heavy objects at waist level.
    - Whenever possible, use hand holds or other lifting attachments on objects being handled.

4.0 MATERIALS STORAGE

Storing materials on-site:

- Store materials at a convenient height (between waist and chest level).
- Leave the lowest shelf unused if necessary.
- Use vertically mobile shelves to avoid bending and overhead reaching.
- Use bin racks for storing small items.
- Store heavy and frequently used materials at waist height.
- Do not store materials at floor level.
- Use hand trucks with elevating devices in storage and loading areas.
- Use hand trucks with a tilting device to avoid bending.
- Use elevating platforms to avoid overhead reaching

HS 402 Excavation and Trenching

Health & Safety Procedures

Procedure: HS 402
Date: February 2018
Revision: 1

HS 402 EXCAVATION AND TRENCHING

1.0 PURPOSE

Proper protective systems will be installed prior to entering into an excavation to ensure protection from excavation collapse. In addition, work will comply with the guidelines found in 29 CFR Subpart P, 1926.650 through 1926.652, as well as any state or local regulations. This procedure applies to all site activities.

2.0 GENERAL REQUIREMENTS

The following factors are to be evaluated by a competent person (CP) and discussed before commencing entry into excavations:

- **Soil Structure**: Excavations in wet soil, sandy soil, or areas that have been backfilled are relatively unstable and must be supported or sloped if personnel are to enter the excavation.
- **Weather Conditions**: Changing weather conditions greatly affect the safety of working in and around excavations. Excess water from rain or snow loosens the soil, increasing the chance of the soil caving in. Excavation should be diked, pumped, or covered to prevent an excessive amount of water from accumulating.
- **Superimposed Loads**: Superimposed loads near excavation walls increase the probability of a cave-in. Heavy equipment and materials from subcontractor activities should be kept back as far as possible. Heavy equipment should be placed on wooden mats or planking to spread the weight more evenly.

Considerations must also be taken when buildings, curbs, trees, utility poles, and other structures are near the excavation. Excavated soil must be stored away from the edge of the excavation.

3.0 SPECIFIC REQUIREMENTS

The following safe operating guidelines will apply to excavations exceeding 4 feet in depth.

- Prior to performing an excavation, personnel should make all efforts to determine and locate both overhead and underground utilities. The utilities shall be marked and identified and discussed at the morning safety meeting. Contact the One-Call Center (Alabama One Call is 811) for the state in which the excavation is to be performed to obtain written clearance. For locations that are not covered by One-Call Centers or local utility companies (i.e., client specific utilities), clearance must be obtained from the client. In addition to obtaining utility clearances, the appropriate party will conduct a utility survey at each defined excavation. Documentation that nearby utilities have been marked on the ground and any

overhead utilities have been clearly identified and that the excavation site has been cleared shall be maintained in the project log book and trailer/support vehicle and communicated to the subcontractor performing the excavation. All utilities shall be identified on a job hazard analysis (JHA) and communicated to all excavation and heavy equipment support personnel.

- Trees, boulders, and other surface encumbrances that create a hazard will be identified and/or isolated before entering the excavation.
- Personnel will ensure subcontractors store and retain excavated materials at least 2 feet away from the edge of the excavation.
- Except in hard rock, personnel will not enter excavations that are below the level of the base of the footing of any foundation or retaining wall unless the wall is underpinned and all other precautions have been taken to ensure the stability of the adjacent walls.
- Personnel subjected to vehicle traffic in excavating operations shall don reflective clothing.
- Excavations shall be inspected by a CP prior to personnel entering the space to perform sampling, quality assurance/quality control, etc.
- When work is required in an excavation that is 4 feet or deeper, one or more ladders shall be provided for access/egress. Within the trench, the maximum horizontal travel distance to a ladder shall be no more than 25 feet. The ladder shall extend a minimum of 3 feet above the excavation and be secured. This ladder shall not be removed until all personnel have exited the excavation. All ladders will meet the requirements of 29 CFR 1926.1053.
- Excavations deeper than 5 feet in which personnel must enter shall be sloped, shored, or supported by some other protective system by the subcontractor prior to entering the space.
- Subcontractors will place guardrails or fences at all excavations that are close to sidewalks, drives, or other thoroughfares. Adequate protection shall also exist at remote excavations where personnel are not present.
- Personnel working or sampling around an excavation deeper than 4 feet will be protected from the fall hazard by an appropriate fall protection measure (e.g., warning line, barricade, fencing).

4.0 PROTECTIVE SYSTEMS

The Occupational Safety and Health Administration (OSHA) requires that all excavations more than 5 feet deep, in which personnel will be enter shall be shored, sheeted, braced, or supported.

- The preferred method is for the subcontractor to slope the sides of the excavation to the angle of repose or the angle of control at which the soil will remain at rest. The angle of repose varies with different kinds of soil; this angle must be determined on each individual excavation, using the following guidelines:

Maximum Allowable Slopes

Soil or Rock Type	Horizontal to Vertical Ratio (Slope)
Stable Rock	Vertical (90 degrees)
Type A	¾:1 (53 degrees)
Type B	1:1 (45 degrees)
Type C	1½:1 (34 degrees)

Note: No soil classification is required if a 1.5:1 slope (34-degree slope) is used. If a 1.5:1 slope is not used, a soil classification must be made by a CP. The excavation must then comply with the above minimum slope requirements.

- The second method of support is shoring, sheeting, tightly placed timber shores, bracing, trench jacks, piles, or other materials installed in a manner strong enough to resist the pressures surrounding the excavations.
- The third method is for the subcontractor to use a trench box, which is a prefabricated movable trench shield made of steel plates, welded to a steel frame.

5.0 HAZARDOUS ATMOSPHERES

When performing activities in excavated areas where a hazardous atmosphere could reasonably exist (e.g., landfill, hazardous storage areas, underground/aboveground storage tanks) personnel will, at a minimum, apply these guidelines:

- Personnel will perform atmospheric testing in the anticipated breathing zone of the work area to determine oxygen content, combustible gas, and toxic gases and vapors, if applicable.
- Personnel will not perform work in areas with less than 19.5% oxygen without the appropriate respiratory protection or adequate ventilation.
- Personnel will not perform work in an area with more than a 10% lower explosive level (LEL).
- Personnel will evaluate toxic gases on a per-site basis using direct-reading equipment.

6.0 COMPETENT PERSON (CP)

Prior to the entrance to any excavated area reaching a minimum depth of 4 feet below ground surface or as designated in the project Health and Safety Plan (HASP), the Project Manager must identify a CP who meets the requirements identified below to serve on-site during all activities conducted in and adjacent to excavated areas. The Corporate Safety Manager will approve individuals that will serve as CP for all activities conducted in excavated areas. The following are qualifications and responsibilities of the CP:

Qualifications:

- Completed an approved excavation CP training course
- Completed a review of the applicable Health and Safety (H&S) standard operating procedures (SOP) and site-specific HASP
- Demonstrated sufficient experience to identify existing and predictable hazards in the excavation and its surroundings

Responsibilities:

- Identify potential, predictable, and existing hazards associated with an excavation and its surrounding area(s) that need to be entered and/or evaluated during work activities.
- Take prompt corrective measures to eliminate potential hazards.
- Perform a daily inspection of the excavation with the subcontractor using the Daily Excavation Checklist (Attachment 1) or equivalent.
- Evaluate and verify the soil classification of the excavation.
- Evaluate and verify that the protective system selected by the subcontractor (if implemented) is adequate for operations.
- Ensure that operational safety practices conform to those identified in this procedure and any additional federal, state, or local requirements.
- Be on-site during all operations and activities where personnel are working in or around an excavation that is 4 feet deep or more.

7.0 ATTACHMENTS

Attachment 1 – Daily Excavation Checklist

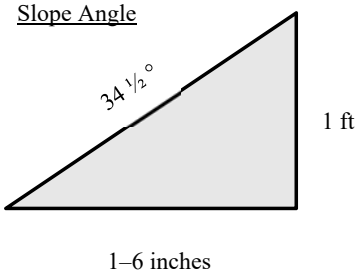
8.0 REFERENCE

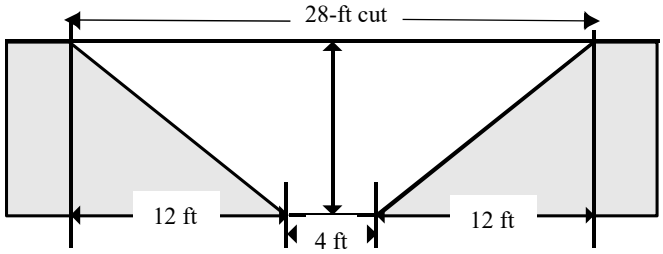
HS 132 Competent Persons

Attachment 1
Daily Excavation Checklist

Daily Excavation Checklist			
Competent Person: Date:			
Site Location: Project:			
Soil Type: Excavation Depth: Excavation Width:			
Type of Protective System Used:			
Indicate for each item: Yes – No – or N/A for not applicable:			
1. General Information:	**Yes**	**No**	**N/A**
A. Is excavation less than five feet in depth?			
B. Is there a potential for a cave-in? ***IF YES, excavation must be sloped, shored, or shielded.**			
C. Is excavation deeper than five feet in depth? *** IF YES, excavation must be sloped, shored, or shielded.**			
D. Is sloping used as your protective system?			

Slope information to keep in mind:





Example of Simple 34-degree slope commonly used around the site for cave-in protection

2. Inspection of Job Site:			
A. Excavations, adjacent areas, and protective systems inspected by a competent person daily before the start of work.			
B. Competent person has the authority to remove employees from the excavation immediately.			
C. Surface encumbrances removed or supported.			
D. Employees protected from loose rock or soil that could pose a hazard by falling or rolling into the excavation.			
E. Hard hats and safety glasses worn by all employees.			
F. Spoils, materials, and equipment set back at least two feet from the edge of the excavation.			
G. Adequate barriers provided at all excavations, wells, pits, shafts, etc.			
H. Warning vests or other highly visible clothing provided and worn by all employees exposed to vehicular traffic and heavy equipment.			
I. Employees required to stand away from vehicles being loaded or unloaded.			
J. Warning system established and utilized when mobile equipment is operating near the edge of the excavation.			
K. Employees prohibited from going under suspended loads.			
3. Utilities:			
A. Location of utilities marked.			
B. Prior to the use of equipment, underground utilities have been located by hand digging. Are any overhead power lines within 20 feet of the excavation?			
C. Underground utilities are protected, supported, or removed when excavation is open.			
D. Are there any manhole covers, water valve covers, concrete christy boxes, or other flush-mounted monuments denoting electrical or other utilities in the vicinity?			

Attachment 1
Daily Excavation Checklist

4. Means of Access and Egress:	**Yes**	**No**	**N/A**
A. Travel distance to means of egress no greater than 25 feet in excavations four feet or more in depth.			
B. Straight ladders used in excavations extend at least three feet above the edge of the trench.			
C. Ramps being used for employee access have been designed by the competent person.			
D. Employees protected from cave-ins when entering or exiting the excavation.			
5. Wet Conditions:			
A. Precautions have been taken to protect employees from the accumulation of water.			
B. Water removal equipment monitored by a competent person.			
C. Surface water or runoff diverted or controlled to prevent accumulation in the excavation.			
D. Inspections have been made after every rainstorm or other hazard-increasing occurrence.			
6. Hazardous Atmosphere: **The atmosphere within the excavation must be tested where there is a reasonable possibility of an oxygen deficiency, combustible or other harmful contaminant exposing employees to a hazard.**			
A. Are there exposed sewer or natural gas lines in excavation?			
B. Is excavation near a landfill area, or are hazardous substances being stored close to the excavation?			
If you answered YES to A or B, then treat excavation as a confined space. **See Confined Spaces Procedure.**			
7. Support Systems:			
A. Materials and/or equipment for support systems selected based on soil analysis, trench depth, and expected loads.			
B. Materials and equipment used for protective systems inspected and in good condition.			
C. Materials and equipment not in good condition have been removed from service.			
D. Protective systems installed without exposing employees to the hazards of cave-ins, collapses, or threat of being struck by materials or equipment.			
E. Members of support system securely fastened to prevent failure.			
F. Support systems provided to ensure stability of adjacent structures, buildings, roadways, sidewalks, walls, etc.			
G. Excavations below the level of the base of a footing have been approved by a Registered Professional Engineer.			
H. Removal of support systems progresses from the bottom and members are released slowly so you can note any indication of possible failure.			
I. Backfilling progresses with removal of support system.			
J. Excavation of material to a level no greater than two feet below the bottom of the support system and only if the system is designed to support the loads calculated for the full depth.			
K. Shield system placed to prevent lateral movement.			
L. Employees are prohibited from remaining in shield system during vertical movement.			
8. Training:			
A. All employees have had Excavation Safety Awareness Training.			
B. Supervisor and/or Site Health and Safety Office (SHS) have had the Excavation Competent Person Training.			

HS 404 Handling Drums and Large Containers

HS 404 HANDLING DRUMS AND LARGE CONTAINERS

1.0 PURPOSE

This procedure provides guidance to personnel and Project Managers to minimize injuries, exposures, environmental contamination, and work disruptions resulting from accidents or injuries that could occur while handling drums and other containers. This procedure applies to all site activities.

2.0 GENERAL REQUIREMENTS

These requirements apply to drums of 10-gallon capacity and larger and to other portable atmospheric containers of 10-gallon capacity or larger. The requirements of this procedure are not applicable to handling containers used to store pressurized gases or to drums of unknown content.

This procedure is intended to cover handling and moving drums containing materials of known content. Drums may contain unused product purchased for a specific use on the site or contain materials (e.g., investigative derived waste [IDW]) generated during site activities. If, during site activities, drums are encountered that are of unknown content, work will be stopped and an experienced contractor familiar with the potential issues associated with unknown wastes and drums will manage and conduct removal of the drums and associated ancillary tasks (e.g., sampling of drums) under a JSA specific to the task.

2.1 Definitions

The following definitions apply to these procedures and are slightly modified for specific operations.

Drums: Hollow, cylindrical containers (capacity between 10 and 55 gallons) used for the storing or containing bulk quantities of work materials or wastes.

Other Large Containers: Containers other than drums that are used to hold bulk quantities of work materials or wastes. These include tanks and roll-off bins, and are generally much larger than drums.

Tanks: Hollow containers of capacity greater than 55 gallons used for storing or containing bulk liquids.

Roll-Off Bins: Rectangular-shaped containers capable of being transported using a specially designed vehicle on which the roll-off bin can be mounted/dismounted. Roll-off bins can be placed at a site, used to hold bulk materials, and then remounted on the vehicle for off-site transportation. Some roll-off bins are equipped with wheels and can be moved manually.

3.0 PROCEDURES

3.1 General

All materials storage and the handling of hazardous materials and drums will be conducted in accordance with 29 CFR 1910.1200 (OSHA Hazard Communication Standard) and all applicable regulatory standards. At a minimum, the storage of containers will conform to the following handling requirements:

- No drum or container will be filled beyond its rated capacity (expressed as either weight or volume). For liquid-containing drums and containers, a void space must be left to allow for liquid expansion in extreme heat.
- Storage locations for drums and containers shall be segregated so that differing types of materials are not stored together or comingled. Chemical products and waste materials shall not be stored together. Incompatible materials (e.g., fuels and oxidizers) shall not be stored together.
- Any drum and container storage structure must have the capability to fully contain a spill consisting of the contents of the largest container permitted for use in the structure plus the volume of water expected to be generated by a 25-year storm. The storage area shall be fenced and locked, and access will be limited to designated personnel.
- In accordance with the requirements of 29 CFR 1910.1200 (Hazard Communication), all drums and other containers will be labeled as to their contents. Hazardous properties (e.g., flammability) shall also be clearly indicated. For containers of wastes, the date that the waste was first accumulated in the drum or container shall be noted.

3.2 Drums

In addition to the above requirements, all drums will be handled in accordance with the following:

- Only drums meeting U.S. Department of Transportation (DOT) specifications shall be used. Drums shall be inspected for rust, corrosion, warping, and other damage. Damaged drums shall not be used.
- Drums containing any materials will be covered with a tight-fitting lid when not in use.
- At the end each working shift, all drums will be placed in the designated storage area appropriate to their contents. Each such area will be properly marked and secured.
- Drums containing hazardous or flammable materials will be electrically grounded to prevent the buildup of static charge. As required, containers will be bonded to ensure that no potential charge difference exists between containers that might come into contact and cause sparking.
- Manual lifting, carrying, or moving drums is not permitted. A drum-handling cart or similar apparatus will be used for moving drums from collection points to the designated storage area (see HS 401 Manual Materials Handling/ Back Injury Prevention).

3.3 Other Containers

- Each container shall be inspected for rust, corrosion, warping, and other damage prior to use. Damaged containers shall not be used.
- Containers larger than 55 gallons or 800 pounds will not be moved manually, nor will they be moved using nonpowered mechanical devices. All handling of large or overweight containers will be accomplished using powered mechanical equipment designed specifically for that purpose. Drums can be moved using (1) a drum grappler attached to a hydraulic excavator; (2) a small front-end loader, which can be either loaded manually or equipped with a bucket sling; (3) a rough-terrain forklift; (4) a roller conveyor equipped with solid rollers; or (5) drum carts designed specifically for drum handling.
- Containers holding material shall be covered with a tight-fitting lid when not in use.
- Containers of hazardous or flammable materials will be electrically grounded to prevent static charge buildup. As required, containers will be bonded to ensure that no potential charge difference exists between containers that might come in contact and cause sparking.

4.0 DRUM HANDLING PROCEDURE

When handling drums, use mechanical aids whenever possible. Do not attempt to raise a full drum alone.

When moving an upright drum be sure to adhere to the following steps:

1. Stand close to the drum with feet apart. One foot at the front and the other behind.
2. Keep knees slightly flexed.
3. Put your hands firmly against upper rim of the drum.
4. Keep arms straight with the elbows locked.
5. Rock the drum gently to get the feel of its contents before you move it.
6. Push the top of the drum away by extending the back leg and shifting your body weight onto your front leg.
7. Stop tilting the drum at the balance point. Use back leg as a counter balance.

When raising a drum that has been laid on its side be sure to adhere to the following steps:

1. Make sure that the drum is empty before raising it.
2. Stand at the end of the drum.
3. Place one foot forward at the side of the drum, the other behind.
4. Bend your hips and knees.
5. Keep the back straight.

6. Grasp the rim about 15 centimeters from the ground with the elbows inside thighs.
7. Stand up by thrusting off with the back leg and continuing in an upward and forward direction.
8. Bring the back leg forward as if you are walking. Keep close to the drum.
9. Stop at the balance point to change hand grip.
10. Set the drum on its base by moving back leg forward. Use the body weight as a counter balance.

5.0 REFERENCES

HS 401 Manual Materials Handling/Back Injury Prevention

HS 502 Manual Hand Tools

Health & Safety Procedures

Procedure: HS 502
Date: February 2018
Revision: 1

HS 502 MANUAL HAND TOOLS

1.0 PURPOSE

All manually operated hand tools and equipment shall be used, handled, and stored in accordance with the following requirements. This procedure applies to all site activities.

2.0 GENERAL REQUIREMENTS

- Use each tool only for the job it was designed to do.
- Discard damaged or abused tools promptly.
- Buy several versions or sizes of the same tool.
- Inspect for distortion, cracks, chips, wear, or mushrooming.
- Keep all tools clean and in working order.
- Be sure handles are fixed firmly to a tool's working end.
- Be sure tools and work mate properly to avoid slippage.
- Never use extensions. Handles are made for the tool.
- Confine impact forces to striking and struck tools.
- Hold work in a clamp or vise, not in your hand.
- Start off slowly when engaging the tool and the work.
- Shut current off before using a tool near electricity.
- Make sure the handle sits securely in your hand.
- Keep moving parts lightly lubed; avoid lube leakage.
- Wear approved safety goggles when using hand tools.
- Keep hands away from sharp edges.
- Pull, don't push, a wrench handle for more leverage.
- Position your body securely while working with the tool.
- Keep jaw teeth, cutters, and blades sharp for better results.
- Keep tool's moving parts properly cleaned and tightened.
- Use steady pressure on jaws and cutters; don't rock the tool.
- Use pads in the jaws to protect soft or crushable work.
- Use a tool close to the vise or clamp.

- Hold work in a clamp or vise with sufficient pressure.
- Keep clamped assemblies away from vibration and bumping.
- Discard a tool instead of repairing it by welding or brazing.
- Keep tools from excessive heat.
- Use comfort grips or gloves for continuous work.
- Follow instructions on the tool and/or package.

3.0 TOOL-SPECIFIC REQUIREMENTS

3.1 Cutting Tools

Choose the proper cutter for the job. Cutters are designed for a specific type, hardness, and size of material. The following are guidelines for using cutting tools:

- Wear safety glasses and protective gloves when using cutters.
- Cut materials straight across; keep the material being cut at right angles to the cutting edges of jaws.
- Prevent injury from flying metal by wrapping a burlap bag, cloth, or rag around the cutting jaws.
- Warn those in the area to take precautionary measures to avoid possible injury from flying metal pieces.
- Keep cutting tools in good repair.
- Adjust and lubricate cutter and moving parts daily if heavily used.
- Sharpen jaws according to manufacturers' instructions.
- Do not use a cutting tool until you are trained in its proper and safe use.
- Do not use cushion grip handles for jobs requiring electrically-insulated handles. Cushion grips are for comfort primarily and do not protect against electric shock.
- Do not use cutters which are cracked, broken, or loose.
- Do not exceed the recommended capacity of a tool.
- Do not cut diagonally.
- Do not rock cutters from side to side when cutting wire.
- Do not pry or twist with tool when cutting.
- Do not hammer on cutting tools or extend the handle length to achieve greater cutting power.
- Do not expose cutters to excessive heat.

3.2 Hammers

Hammers are designed according to the intended purpose. Select a hammer that is comfortable for you and that is the proper size and weight for the job. Misuse can cause the striking face to chip, possibly causing a serious injury. The following are guidelines for working with hammers:

- Choose a hammer with a striking face diameter approximately ½ inch larger than the face of the tool being struck (e.g., chisels, punches, wedges).
- Ensure that the head of the hammer is firmly attached to the handle.
- Replace loose, cracked, or splintered handles.
- Discard any hammer with mushroomed or chipped face or with cracks in the claw or eye sections.
- Strike a hammer blow squarely with the striking face parallel to the surface being struck. Always avoid glancing blows and over and under strikes. Hammers with beveled faces are less likely to chip or spall.
- Look behind and above you before swinging the hammer.
- Watch and focus on the object you are hitting.
- Hold the hammer with your wrist straight and your hand firmly wrapped around the handle.
- Do not use a hammer with a loose or damaged handle.
- Do not use handles that are rough, cracked, broken, splintered, sharp-edged, or loosely attached to the head.
- Do not use any hammer head with dents, cracks, chips, mushrooming, or excessive wear.
- Do not use a hammer for any purpose for which it was not designed or intended.
- Do not use one hammer to strike another hammer, other hard metal objects, stones, or concrete.
- Do not redress, grind, weld, or reheat-treat a hammer head.
- Do not strike with the side or cheek of the hammer.

3.3 Saws

Saws are made in various shapes and sizes and for many uses. Use the correct saw for the job. The following are guidelines for working with saws:

- Wear safety glasses.
- Select a saw of proper shape and size for stock being used.
- Choose a saw handle that keeps your wrist in a natural position in the horizontal plane.

- Choose a saw with a handle opening of at least 5 inches long and 2.5 inches wide and slanted at a 15-degree angle.
- Check the stock being cut for nails, knots, and other objects that may damage or buckle the saw.
- Start the cut by placing your hand beside the cut mark with your thumb upright and pressing against blade. Start the cut carefully and slowly to prevent blade from jumping. Pull upward until blade bites. Start with a partial cut, and then set the saw at the proper angle.
- Apply pressure on downstroke only.
- Hold stock being cut firmly in place.
- Use a helper, a supporting bench, or vise to support long stock if required.
- Keep teeth and blades properly set.
- Protect teeth of saw when not in use.
- Keep saw blades clean.
- Hacksaws:
    - Select correct blade for material being cut.
    - Secure blade with the teeth pointing forward.
    - Keep blade rigid and frame properly aligned.
    - Cut using strong, steady strokes, directed away from you.
    - Use entire length of blade in each cutting stroke.
    - Use light machine oil on the blade to keep it from overheating and breaking.
    - Cut harder materials more slowly than soft materials.
    - Clamp thin, flat pieces requiring edge cutting.

3.4 Pipe Tools (Wrenches, Cutters, Reamers, and Threaders)

Pipe tools are made in various shapes and sizes and for many uses. Always use the correct tool for the job. The following are guidelines for working with pipe tools:

- Select a pipe wrench with sufficient capacity and leverage to do the job.
- Use a pipe wrench to turn or hold a pipe. Never use a pipe wrench to bend, raise, or lift a pipe.
- Adjust the pipe wrench grip to maintain a gap between the back of the hook jaw and the pipe. This concentrates the pressure at the jaw teeth, producing the maximum gripping force. It also aids the ratcheting action.
- Inspect pipe wrenches periodically for worn or unsafe parts and replace them (e.g., check for worn threads on the adjustment ring and movable jaw).
- Keep pipe wrench teeth clean and sharp.
- Face a pipe wrench forward. Turn wrench so pressure is against heel jaw.

- Pull, rather than push on the pipe wrench handle. Maintain a proper stance with feet firmly placed to hold your balance.
- Do not use a pipe wrench as a hammer or strike a pipe wrench with a hammer.
- Do not use pipe wrenches on nuts and bolts.
- Do not use a pipe extender for extra leverage. Get a larger pipe wrench.
- Replace pipe cutter wheels which are nicked or otherwise damaged.
- Use a three- or four-wheeled cutter, if there is not enough space to swing the single wheel pipe cutter completely around the pipe.
- Choose a cutting wheel suitable for cutting the type of pipe material required:
  - Thin wheel for cutting ordinary steel pipe
  - Stout wheel for cutting cast iron
  - Other wheels for cutting stainless steel, plastic and other materials
- Select the proper hole diameter and correct tap size to tap a hole. The hole should be sized so that the thread cut by the tap will be about 75% as deep as the thread on the tap.
- Use a proper tap wrench (with a "T" handle) for turning a tap.
- Use lubricant or machine cutting fluid with metals other than cast iron.
- Do not permit chips to clog flutes (groves in the tap that allow metal chips to escape from the hole). The chips may prevent the tap from turning; this may result in the tap breaking if you continue to apply pressure.
- Do not use a conventional adjustable wrench for turning a tap; it will cause uneven pressure on the tap that may cause it to break.
- Do not attempt to thread hardened steel; this can chip or damage the die.
- Do not thread any rod or other cylindrical object that is larger in diameter than the major diameter of the die thread.
- Do not use a spiral reamer on a rotating pipe. The reamer may snag and cause serious injury.

3.5 Pliers and Wire Cutters

Pliers are made in various shapes and sizes and for many uses. Use the correct pliers or wire cutters for the job. The following are general guidelines for using pliers and wire cutters:

- Choose pliers or wire cutters that have a grip span of 2½ to 3½ inches to prevent your palm or fingers from being pinched when the tools are closed.
- Use adjustable pliers that allow you to grip the workpiece firmly while maintaining a comfortable handgrip (i.e., hand grasp is not too wide).
- Use tools only if they are in good condition.

- Make sure that the cutting edges are sharp. Dull and worn-down cutting edges require many times more force for cutting.
- Make sure that the toothed jaws are clean and sharp. Greasy or worn-down jaws can result in compromised safety. Such tools also require increased force to hold the workpiece which, in turn, increases the risk of muscular fatigue and repetitive strain injuries.
- Oil pliers and wire cutters regularly. A drop of oil on the hinge will make the tools easier to use.
- Pull on the pliers; do not push away from you when applying pressure. If the tool slips unexpectedly, you may lose your balance or injure your hand.
- Cut at right angles. Never rock the cutting tool from side to side or bend wire back and forth against the cutting edges.
- Do not cut hardened wire unless the pliers or wire cutters are specifically manufactured for this purpose.
- Do not expose pliers or wire cutters to excessive heat.
- Do not bend stiff wire with light pliers. Needle-nose pliers can be damaged by using the tips to bend large wire. Use a sturdier tool.
- Do not use pliers as a hammer.
- Do not hammer on pliers or wire cutters to cut wires or bolts.
- Do not extend the length of handles to gain greater leverage. Use a larger pair of pliers for gripping or a bolt cutter for cutting.
- Do not use cushion grip handles for jobs requiring tools with electrically insulated handles. Cushion grips are for comfort primarily and do not protect against electric shock.
- Do not use pliers on nuts and bolts; use a wrench.

3.6 Screwdrivers

Screwdrivers are made in various shapes and sizes and for many uses. Use the correct screwdriver for the job. The following are guidelines for working with screwdrivers:

- Choose contoured handles that fit the shank tightly, with a flange to keep the hand from slipping off the tool.
- Use a slot screwdriver with a blade tip width that is the same as the width of the slotted screw head.
- Use the correct size and type of screwdriver: a Phillips screwdriver may slip out of a screw head designed for use with the slightly flatter-tipped Pozidriv screwdriver.
- Use a vise or clamp to hold the stock if the piece is small or moves easily.
- Keep the screwdriver handle clean. A greasy handle could cause an injury or damage from unexpected slippage.

- Use screwdrivers that have insulated handles designed for electrical work and a nonconducting shaft if work must be carried out on live electrical equipment. Remember, most plastic handles are designed for grip and comfort.
- Use nonmagnetic tools when working near strong magnets (e.g., in some laboratories).
- Use a screw-holding screwdriver (with screw-holding clips or magnetic blades) to get screws started in awkward, hard-to-reach areas. Square-tipped screwdrivers (e.g., Robertson) that hold screws with recessed square holes are also useful in such situations.
- Use an offset screwdriver in close quarters where a conventional screwdriver cannot be used.
- Use a screwdriver that incorporates the following features when continuous work is needed:
    - A pistol grip to provide for a straighter wrist and better leverage
    - A "Yankee drill" mechanism (spiral ratchet screwdriver or push screwdriver) which rotates the blade when the tool is pushed forward
    - A ratchet device to drive hard-to-move screws efficiently, or use a powered screwdriver
- File a rounded tip square making sure the edges are straight. A dull or rounded tip can slip out of the slot and cause hand injury or damage to materials.
- Store screwdrivers in a rack or partitioned pouch so that the proper screwdriver can be selected quickly.
- Do not lean or push on a screwdriver with any more force than necessary to keep contact with the screw. A screw properly piloted and fitted will draw itself into the right position when turned. Keep the shank directly over the screw being driven.
- Do not hold the stock in one hand while using the screwdriver with the other. If the screwdriver slips out of the slot, you may cut your hand.
- Do not hammer screws that cannot be turned.
- Do not grind the tip to fit another size screw head.
- Do not try to use screwdrivers on screw heads for which they are not designed (e.g., straight blade screwdrivers on Phillips, clutch head, Torx or multifluted spline screw heads).
- Do not use defective screwdrivers (e.g., ones with rounded or damaged edges or tips, split or broken handles, or bent shafts).
- Do not use a screwdriver for prying, punching, chiseling, scoring, scraping, or stirring paint.
- Do not use pliers on the handle of a screwdriver for extra turning power. A wrench should be used only on the square screwdriver shank designed for that purpose.

- Do not expose a screwdriver blade to excessive heat. Heat can affect the temper of the metal and weaken the tool.
- Do not use a screwdriver to check if an electrical circuit is live. Use a suitable meter or other circuit testing device.
- Do not carry screwdrivers in your pockets.

3.7 Snips

Snips are made in various shapes and sizes for various tasks. The handle can be like those on scissors with finger and thumb holes or like pliers handles. Models are available for cutting in straight lines and in curves to the left or right:

- Universal snips can cut in both straight and wide curves.
- Straight snips and duckbill snips (flat blade, perpendicular to the handle, with pointed tips) are generally designed to cut in straight lines; some duckbill snips are designed for cutting curved lines.
- Hawk's bill snips (with crescent-shaped jaws) are used for cutting tight circles.
- Aviation snips have compound leverage that reduces the effort required for cutting.
- Offset snips have jaws that are set at an angle from the handle.

Select the right size and type of snips for the job; check the manufacturer's specifications about the intended use of the snips (e.g., type of cut—straight, wide curve, tight curve, right or left—and maximum thickness and kind of metal or other material that can be cut).

Follow the general guidelines below for using snips:

- Wear safety glasses and protective gloves when working with snips. Small pieces of metal may go flying in the air and cut edges of metal are sharp.
- Use only snips that are sharp and in good condition.
- Use snips for cutting soft metal only. Hard or hardened metal should be cut with tools designed for that purpose.
- Use ordinary hand pressure for cutting. If extra force is needed, use a larger tool.
- Cut so that the waste is on the right if you are right-handed or on the left if you are left- handed.
- Avoid springing the blades; this results from trying to cut metal that is too thick or heavy for the snips you are using.
- Keep the nut and the pivot bolt properly adjusted at all times.
- Oil the pivot bolt on the snips occasionally.
- Do not try to cut sharp curves with straight cut snips.

- Do not cut sheet metal thicker than the manufacturer's recommended upper limit (e.g., cuts up to 16-gauge cold, rolled steel or 18-gauge stainless steel). Do not extend the length of handles to gain greater leverage.
- Do not hammer or use your foot to exert extra pressure on the cutting edges.
- Do not use cushion grip handles for tasks requiring insulated handles. They are for comfort primarily and not for protection against electric shocks.
- Do not attempt to sharpen snips in a sharpening device designed for scissors, garden tools, or cutlery.

3.8 Wood Chisels

Wood chisels are made in various shapes and sizes and for many uses. Use the correct chisel for the job. The following are guidelines for working with wood chisels:

- Wear safety glasses when using wood chisels.
- Choose smooth, rectangular handles that have no sharp edges and are attached firmly to the chisel.
- Ensure that the cutting edge is sharp. Dull chisels can be difficult to control and require more effort to do the job.
- Check stock thoroughly for knots, staples, nails, screws, or other foreign objects before chiseling.
- Clamp stock so it cannot move.
- Adjust your stance so that you do not lose your balance if the tool slips.
- Chip or cut away from yourself.
- Keep your hands and body behind the cutting edge.
- Use a wooden or plastic mallet with a large striking face on all chisels. Only heavy-duty or framing chisels are made of a solid or molded handle that can be struck with a steel hammer.
- Make finishing or paring cuts with hand pressure alone.
- Place chisels safely within the plastic protective caps to cover cutting edges when not in use.
- Replace any chisel that is bent or shows dents, cracks, chips, or excessive wear.
- Store chisels in a storage roll, a cloth, or plastic bag with slots for each chisel, and keep them in a drawer or tray.
- Replace broken or splintered handles.
- Sharpen cutting edges as often as necessary.
- Do not use a wood chisel as a pry or a wedge.
- Do not use a wood chisel on metal.

- Do not use an all-steel chisel with a mushroomed face or a chipped edge. Redress with a file or whetstone.
- Do not use a grinder to redress heat-treated tools. Use a whetstone.
- Do not use a dull chisel.

3.9 Wrenches

Wrenches come in all shapes, styles, and sizes; use the correct wrench for the job—pipe wrenches for pipes and plumbing fittings, and general-use wrenches for nuts and bolts. The following are guidelines for using wrenches:

- Discard any damaged wrenches (e.g., open-ended wrenches with spread jaws or box wrenches with broken or damaged points).
- Select the correct jaw size to avoid slippage.
- Position your body in a way that will prevent you from losing balance and hurting yourself if the wrench slips or something (e.g., a bolt) suddenly breaks.
- Use a box or socket wrench with a straight handle, rather than an off-set handle, when possible.
- Ensure that the jaw of an open-ended wrench is in full contact (fully seated, flat, not tilted) with the nut or bolt before applying pressure.
- Face an adjustable wrench forward, adjust tightly, and turn the wrench so pressure is against the permanent or fixed jaw.
- Ensure that the teeth of a pipe wrench are sharp and free of oil and debris and that the pipe or fitting is clean to prevent unexpected slippage and possible injuries.
- Apply a small amount of pressure to a ratchet wrench initially to ensure that the ratchet wheel (or gear) is engaged with the pawl (a catch fitting in the gear) for the direction you are applying pressure.
- Support the head of the ratchet wrench when socket extensions are used.
- Pull on a wrench using a slow, steady pull; do not use fast, jerky movements.
- Stand aside when work is done with wrenches overhead.
- Make sure adjustable wrenches do not slide open during use.
- Keep tools well maintained (cleaned and oiled).
- Clean and place tools and wrenches in a tool box, rack, or tool belt after use.
- Do not push on a wrench; losing your balance is more likely if the wrench slips.
- Do not use a wrench that is bent or damaged.
- Do not pull on an adjustable wrench that is loosely adjusted.
- Do not use pipe wrenches on nuts or bolts.
- Do not use pipe wrenches for lifting or bending pipes.

- Do not use a wrench on moving machinery.
- Do not use the wrong tools for the job. For example, never use pliers instead of a wrench or a wrench as a hammer.
- Do not use a makeshift wrench.
- Do not insert a shim in a wrench for better fit.
- Do not strike a wrench with a hammer or similar object to gain more force.
- Do not increase the leverage by adding sleeved additions (e.g., a pipe) to increase tool handle length.
- Do not expose a wrench to excessive heat (like from a blow torch) that could affect the temper of the metal and ruin the tool.

3.10 Chisels

- Personnel will not use a chisel that has a dull cutting edge or ones that have mushroomed striking heads.
- Hold a chisel by using a tool holder if possible.
- Clamp small workpieces in the vise and chip towards the stationary jaw when working with a chisel.

3.11 Vises

- When clamping a long workpiece in a vise, support the far end of the workpiece by using an adjustable pipe stand, saw horse, or box.
- Position the workpiece in the vise so that the entire face of the jaw supports the workpiece.
- Do not use a vise that has worn or broken jaw inserts or has cracks or fractures in the body of the vise.
- Do not slip a pipe over the handle of a vise to gain extra leverage.

3.12 Clamps

- Do not use the C-clamp for hoisting materials.
- Do not use the C-clamp as a permanent fastening device.

3.13 Jacks

- Do not exceed the jack's rated lifting capacity as noted on the label of the jack.
- Clear all tools, equipment, and any other obstructions from under the vehicle before lowering the jack.

3.14 Tool Boxes, Chests, and Cabinets

- Use the handle when opening and closing a drawer or door of a tool box, chest, or cabinet.
- Tape over or file off sharp edges on toolboxes, chests, and cabinets.
- Do not stand on toolboxes, chests, or cabinets to gain extra height.
- Lock the wheels on large toolboxes, chests, and cabinets to prevent them from rolling.
- Push large chests, cabinets, and toolboxes rather that pulling them.
- Do not open more than one drawer of a toolbox at a time.
- Close and lock all drawers and doors before moving the tool chest to a new location.
- Do not move a toolbox, chest, or cabinet if it has loose tools or parts on the top.

HS 503 Powered Hand Tools

Health & Safety Procedures

Procedure: HS 503
Date: February 2018
Revision: 1

HS 503 POWERED HAND TOOLS

1.0 PURPOSE

All power-operated hand tools and equipment shall be used, handled, and stored in accordance with the following requirements.

2.0 GENERAL REQUIREMENTS

2.1 Selection and Use

- Select tools that can be used without bending the wrist. Hand tools should allow the operator to grasp, hold, and use the tool with the wrist held straight.
- Select the tool with the workplace layout and job design in mind. Sometimes a tool is correct for one operation and incorrect for another.
- Use the right tool for the job. Ensure it is the right size and has sufficient power to do the job safely. When there is a choice, select a tool of a low weight.
- Select low-vibrating tools or choose tools with vibration-absorbing handles, like those covered with cork, rubber, plastic, or plastic bonded to steel to reduce hand-arm vibration.
- Choose hand tools that have the center of gravity within or close to the handle.
- Select tools with rounded and smooth handles that you can grip easily.
- Choose hand tools with double handles (if available) to permit easier holding and better manipulation of the tool.
- Select tools with a trigger strip, rather than a trigger button. This strip will allow you to exert more force over a greater area of the hand that, in turn, will reduce muscle fatigue.
- Ensure that the trigger works easily to reduce the effort needed to operate it.
- Ensure that your tool is well maintained and in good repair.
- Counter balance frequently used tools that weigh more than one pound.
- Hold the tool close to the body. Do not overreach.
- Keep good balance and proper footing at all times. This will help operators to control the tool better, especially in response to unexpected situations.
- Rest your hands by putting the tool down when you are not using it.
- Reduce power to the lowest setting that can complete the job safely. This action reduces tool vibration at the source.

- Ensure that cutting tools, drill bits, etc., are kept sharp, clean, and well maintained.
- Do not wear gloves, loose clothing or jewelry while using revolving power tools. Tie back long hair or wear appropriate hair protection to prevent hair from getting caught in moving parts of equipment.
- Do not use a tool unless you have been trained to use it safely and know its limitations and hazards.

2.2 Storage and Handling

- All tools shall be stored in a manner to prevent damage and injury. Store tools in a dry, secure location when they are not being used.
- Tools shall be properly put away after use.
- Sharp or pointed tools shall be handled only if the sharp/pointed edge is covered, carried in a tool box or other device designed for that purpose, or the sharp/pointed edge is pointed downward, away from the body.

3.0 ELECTRIC TOOLS

3.1 Inspection

- Inspect tools for any damage prior to each use.
- Ensure that the power tool has the correct guard, shield, or other attachment that the manufacturer recommends.
- Ensure that the tools are properly grounded using a three-prong plug, are double insulated (and are labeled as such), or are powered by a low-voltage isolation transformer: this will protect users from an electrical shock.
- Check electric tools to ensure that a tool with a three-prong plug has an approved three-wire cord and is grounded. The three-prong plug should be plugged in a properly grounded three-pole outlet. If an adapter must be used to accommodate a two-hole receptacle, the adapter wire must be attached to a known, functioning ground. Never remove the third, grounding prong from a plug.
- Check the handle and body casing of the tool for cracks or other damage.
- Confirm that auxiliary or double handles used for any tools have been installed correctly and securely.
- Inspect cords for defects. Check the power cord for cracking, fraying, and other signs of wear or faults in the cord insulation.
- Check for damaged switches and ones with faulty trigger locks.
- Inspect the plug for cracks and for missing, loose, or faulty prongs.
- Remove any defective tool from service, and tag it clearly "Out of service for repair." Replace damaged equipment immediately. Do not use defective tools temporarily.

3.2 Battery Powered Tools

- Use the type of battery that the tool manufacturer specifies for the battery-powered tool that you are using.
- Recharge a battery-powered tool only with a charger that is specifically intended for the battery in that tool.
- Remove the battery from the tool or ensure that the tool is switched off or locked off before changing accessories, making adjustments, or storing the tool.
- Store a battery pack safely so that no metal parts, nails, screws, wrenches, and so on can come in contact with the battery terminals; this could result in shorting the battery and possibly cause sparks, fires, or burns.

3.3 Using Electric Tools

- Switch off the tools before connecting them to a power supply.
- Have any power cord that feels more than comfortably warm or any tool that is sparking excessively checked by an electrician or other qualified person.
- Disconnect the power supply before making adjustments or changing accessories.
- Remove any wrenches and adjusting tools before turning on a tool.
- Inspect the cord for fraying or damage before each use. Tag defective tools clearly with an "Out of service" tag and replace immediately with a tool in good running order.
- Keep power cords clear of tools and the path that the tool will take during use.
- Use clamps, a vise or other devices to hold and support the piece being worked on, when practical to do so. This will allow you to use both hands for better control of the tool and will help prevent injuries if a tool jams or binds in a work piece.
- Use only approved extension cords that have the proper wire size for the length of cord and power requirements of the electric tool that you are using. This will prevent the cord from overheating.
- Use outdoor extension cords marked "W-A" or "W" for outdoor work.
- Suspend power cords over aisles or work areas to eliminate stumbling or tripping hazards.
- Eliminate octopus connections. If more than one receptacle plug is needed, use a power bar or power distribution strip that has an integral power cord and a built-in overcurrent protection.
- Pull the plug, not the cord when unplugging a tool. Pulling the cord causes wear and may adversely affect the wiring to the plug, and electrical shock to the operator may result.
- Keep power cords away from heat, water, oil, sharp edges, and moving parts. They can damage the insulation and cause a shock.

- Avoid accidental starting by ensuring the tool is turned off before you plug it in. Also, do not walk around with a plugged-in tool with your finger touching the switch.
- Do not bypass the on/off switch and operate the tools by connecting and disconnecting the power cord.
- Do not disconnect the power supply of the tool by pulling or jerking the cord from the outlet.
- Do not leave a running tool unattended. Do not leave it until it has been turned off, has stopped running completely, and has been unplugged.
- Do not use electric tools in wet conditions or damp locations unless tool is connected to a ground fault circuit interrupter (GFCI).
- Do not expose electric power tools to rain or wet conditions; wet tools increase the likelihood of electric shock.
- Avoid body contact with grounded surfaces like refrigerators, pipes, and radiators when using electric powered tools; this will reduce the likelihood of shock if the operator's body is grounded.
- Do not plug several power cords into one outlet by using single-to-multiple outlet adapters or converters (i.e., cube taps).
- Do not use light duty power cords.
- Do not connect or splice extension cords together to make a longer connection. The resulting extension cord may not be able to provide sufficient current or power safely.
- Do not carry electrical tools by the power cord.
- Do not tie power cords in knots. Knots can cause short circuits and shocks. Loop the cords or use a twist lock plug.
- Never break off the third prong on a plug. Replace broken three-prong plugs and make sure the third prong is properly grounded.
- Never use extension cords as permanent wiring. Use extension cords only as a temporary power supply to an area that does not have a power outlet.
- Do not walk on or allow vehicles or other moving equipment to pass over unprotected power cords. Cords should be put in conduits or protected by placing planks on each side of them.
- Do not brush away sawdust, shavings or turnings while the tool is running. Never use compressed air for cleaning surfaces or removing sawdust, metal turnings, etc.
- Do not operate tools in an area containing explosive vapors or gases.
- Do not clean tools with flammable or toxic solvents.
- Do not surprise or touch anyone who is operating a tool. Startling a tool operator could end up causing an accident or injury.

3.3.1 Belt Sanders

- Wear safety glasses.
- Make sure the sander is switched "off" before connecting the power supply.
- Disconnect power supply before changing a sanding belt, making adjustments, or emptying dust collector.
- Inspect sanding belts before using them. Replace those belts that are worn or frayed.
- Install sanding belts that are the same widths as the pulley drum.
- Adjust sanding belt tension to keep the belt running true and at the same speed as pulley drum.
- Secure the sanding belt in the direction shown on the belt and the machine.
- Keep hands away from a sanding belt.
- Use two hands to operate sanders—one on a trigger switch and one on a front handle knob.
- Keep all cords clear of sanding area during use.
- Clean dust from a motor and vents at regular intervals.
- Do not use a sander without an exhaust system or a dust collector present that is in good working order. Empty the collector when 1/4 full. The dust created when sanding can be a fire and explosion hazard. Proper ventilation is essential.
- Do not exert excessive pressure on a moving sander. The weight of the sander supplies adequate pressure for the job.
- Do not work on unsecured stock unless it is heavy enough to stay in place. Clamp the stock into place or use a "stop block" to prevent movement.
- Do not overreach. Always keep proper footing and balance.
- Do not cover the air vents of the sander.

3.3.2 Drills

- Wear safety glasses.
- Keep drill air vents clear to maintain adequate ventilation.
- Keep drill bits sharp.
- Keep all cords clear of the cutting area during use. Inspect for frays or damage before each use.
- Disconnect power supply before changing or adjusting bit or attachments.
- Tighten the chuck securely. Remove chuck key before starting drill.
- Secure workpiece being drilled to prevent movement.
- Slow the rate of feed just before breaking through the surface.

- Drill a small "pilot" hole before drilling large holes.
- Do not drill with one hand while holding the material with the other. When working on small pieces, clamp stock so work will not twist or spin.
- Do not use a bent drill bit.
- Do not exceed the manufacturer's recommended maximum drilling capacities.
- Do not use a hole saw cutter without the pilot drill.
- Do not use high speed steel (HSS) bits without cooling or using lubrication.
- Do not attempt to free a jammed bit by starting and stopping the drill. Unplug the drill and then remove the bit from the workpiece.
- Do not reach under or around stock being drilled.
- Do not overreach. Always keep proper footing and balance.
- Do not raise or lower the drill by its power cord.

3.3.3 Planers

- Wear safety glasses.
- Disconnect the planer from the power supply before making any adjustments to the cutter head or blades.
- Use blades of the same weight and set at the same height.
- Ensure that the blade-locking screws are tight.
- Remove adjusting keys and wrenches before turning on power.
- Support the material (stock) in a comfortable position that will allow the job to be done safely and accurately.
- Check stock thoroughly for staples, nails, screws, or other foreign objects before using a planer.
- Start a cut with the infeed table (front shoe) resting firmly on the stock and with the cutter head slightly behind the edge of the stock.
- Use two hands to operate a planer—one hand on the trigger switch and one on a front handle.
- Do not put your finger or any object in a deflector to clean out chips while a planer is running.
- Disconnect the power supply when stopping to dump out chips.
- Do not set a planer down until blades have stopped turning.
- Keep all cords clear of cutting area.

3.3.4 Routers

- Wear safety glasses.
- Disconnect the power supply before making any adjustments or changing bits.

- Ensure that the bit is securely mounted in the chuck and the base is tight.
- Put the base of the router on the work, template or guide. Make sure that the bit can rotate freely before switching on the motor.
- Secure stock. Never rely on yourself or a second person to support or hold the material. Sudden torque or kickback from the router can cause damage and injury.
- Before using a router, check stock thoroughly for staples, nails, screws, or other foreign objects.
- Keep all cords clear of cutting area.
- Hold both hands on router handles always, until a motor has stopped. Do not set the router down until the exposed router bit has stopped turning.
- Do not overreach. Keep proper footing and balance.
- When inside routing, start the motor with the bit above the stock. When the router reaches full power, lower the bit to two times the required depth.
- When routing outside edges, guide the router counter clockwise around the work.
- When routing bevels, moldings and other edge work, make sure the router bit is in contact with the stock to the left of a starting point and is pointed in the correct cutting direction.
- Feed the router bit into the material at a firm, controlled speed.
- Remember, with softwood, you can sometimes move the router as fast as it can go. With hardwood, knotty and twisted wood, or with larger bits, cutting may be very slow.
- Listen to the sound of the motor. The sound of the motor can indicate safe cutting speeds. When the router is fed into the material too slowly, the motor makes a high-pitched whine. When the router is pushed too hard, the motor makes a low growling noise.
- Make two or more passes to prevent the router from burning out or kicking back when the type of wood or size of the bit requires going slowly.
- Test the router on scrap lumber similar to the work to decide the depth of cut and how many passes to make.

3.3.5 Circular Saws

- Wear safety glasses and hearing protection.
- Check the retracting lower blade guard to make certain it works freely.
- Ensure that the blade that you have selected is sharp enough to do the job. Sharp blades work better and are safer.
- Check the saw for proper blade rotation.
- Set the depth of the blade while the saw is unplugged, and lock it at a depth where the lowest tooth does not extend more than about 1/8 inch beneath the wood.

- Keep all cords clear of cutting area.
- Remember circular saws are designed for right-hand operation; left-handed operation will demand more care to operate safely.
- Check the retracting lower blade guard frequently to make certain it works freely. It should enclose the teeth as completely as possible. Cover the unused portion of the blade when cutting.
- Check that the retracting lower blade guard has returned to its starting position before laying down the saw.
- Keep upper and retracting lower blade guard clean and free of sawdust.
- Disconnect power supply before adjusting or changing the blade.
- Allow the saw to reach full power before starting to cut.
- Use two hands to operate saws—one on a trigger switch and one on a front knob handle.
- Keep the motor free from accumulation of dust and chips.
- Select the correct blade for stock being cut and allow it to cut steadily. Do not force it.
- Secure work being cut to avoid movement.
- Do not hold or force the retracting lower guard in the open position.
- Do not place your hand under the shoe or guard of the saw.
- Do not overtighten the blade-locking nut.
- Do not twist the saw to change, cut, or check alignment.
- Do not use a saw that vibrates or appears unsafe in any way.
- Do not force the saw during cutting.
- Do not cut materials without first checking for obstructions or other objects such as nails and screws.
- Do not carry the saw with a finger on the trigger switch.
- Do not overreach. Keep proper footing and balance.
- Do not rip stock without using a wedge or guide clamped or nailed to the stock.

3.3.6 Other Saws

- Wear safety glasses.
- Disconnect power supply before changing or adjusting blades.
- Use lubricants when cutting metals.
- Keep all cords clear of cutting area.
- Position the saw beside the material before cutting and avoid entering the cut with a moving blade.

- Make sure guards, if present, are installed and are working properly.
- Remember sabre saws cut on the upstroke.
- Secure and support stock as close as possible to the cutting line to avoid vibration.
- Keep the base or shoe of the saw in firm contact with the stock being cut.
- Select the correct blade for the material being cut and allow it to cut steadily. Do not force it. Clean and sharp blades operate best.
- Set the blade to go no further than 1/8 to 1/4 inch deeper than the material being cut.
- Do not start cutting until the saw reaches its full power.
- Do not force a saw along or around a curve. Allow the machine to turn with ease.
- Do not insert a blade into or withdraw a blade from a cut or lead hole while the blade is moving.
- Do not put down a saw until the motor has stopped.
- Do not reach under or around the stock being cut.
- Maintain control of the saw always. Avoid cutting above shoulder height.

The following guidelines are specific for external cuts:

- Make sure that the blade is not in contact with the material or the saw will stall when the motor starts.
- Hold the saw firmly down against the material and switch the saw on.
- Feed the blade slowly into the stock, maintaining an even forward pressure.

The following guidelines are specific for internal cuts:

- Drill a lead hole slightly larger than the saw blade. With the saw switched off, insert the blade in the hole until the shoe rests firmly on the stock.
- Do not let the blade touch the stock until the saw has been switched on.

4.0 PNEUMATIC TOOLS

4.1 General Requirements

- Wear safety glasses.
- Ensure that the compressed air supplied to the tool is clean and dry. Dust, moisture, and corrosive fumes can damage a tool. An in-line regulator filter and lubricator increase tool life.
- Keep tools clean and lubricated, and maintain them according to the manufacturers' instructions.

- Use only the attachments that the manufacturer recommends for the tools you are using.
- Be careful to prevent hands, feet, or body from injury in case the machine slips or the tool breaks.
- Reduce physical fatigue by supporting heavy tools with a counter-balance wherever possible.
- Use the proper hose and fittings of the correct diameter.
- Use hoses specifically designed to resist abrasion, cutting, crushing, and failure from continuous flexing.
- Choose air-supply hoses that have a minimum working pressure rating of 150 pounds per square inch gauge (psig) or 150% of the maximum pressure produced in the system, whichever is higher.
- Check hoses regularly for cuts, bulges, and abrasions. Tag and replace, if defective.
- Blow out the air line before connecting a tool. Hold hose firmly and blow away from yourself and others.
- Make sure that hose connections fit properly and are equipped with a mechanical means of securing the connection (e.g., chain, wire, positive locking device).
- Install quick disconnects of a pressure-release type rather than a disengagement type. Attach the male end of the connector to the tool, NOT the hose.
- Do not operate the tool at a pressure above the manufacturer's rating.
- Turn off the air pressure to the hose when not in use or when changing power tools.
- Do not carry a pneumatic tool by its hose.
- Avoid creating trip hazards caused by hoses laid across walkways or curled underfoot.
- Do not use compressed air to blow debris or to clean dirt from clothes.

4.2 Pneumatic Nailing and Stapling Tools

- Permit only experienced and trained persons to operate pneumatic nailing and stapling tools.
- Wear safety glasses or a face shield and, where necessary, use hearing protection.
- Inspect a tool before connecting it to air supply.
- Check tool safety mechanisms if applicable.
- Securely tighten all screws and cylinder caps.
- Check correct air supply and pressure before connecting a tool.

- Check that the tool is correctly and securely connected to the air supply hose and that it is in good working order, with the safety mechanism operative, before using.
- Always handle a tool as if it is loaded with fasteners (e.g., nails, staples).
- Equip tools with a work-contacting element that limits the contact area to one that is as small as practical.
- Make sure that the mechanical linkage between the work-contacting element and trigger is enclosed.
- Disconnect a tool from the air supply when the tool is unattended and during cleaning or adjustment. Before clearing a blockage, be sure that depressing the trigger exhausts all air from the tool.
- Use only fasteners recommended by the manufacturer.
- Permit only properly trained people to carry out tool maintenance.
- Do not operate at a pressure above the manufacturer's rating.
- Do not depress the trigger unless the nosepiece of tool is directed onto a safe work surface.
- Do not carry a tool with the trigger depressed.
- Do not load a tool with fasteners while the trigger is depressed.
- Do not overreach. Keep proper footing and balance.
- Do not use compressed air to blow debris or to clean dirt from clothes.

HS 504 Heavy Equipment

HS 504 HEAVY EQUIPMENT

1.0 PURPOSE

The following procedure outlines safe working requirements while operating heavy equipment to comply with 29 CFR 1926 Subpart O and 29 CFR 1926.602. This procedure applies to personnel performing activities that use heavy equipment and is also resource information for involvement in projects where subcontractors use heavy equipment.

2.0 DEFINITIONS

Heavy Equipment: For this procedure, all excavating equipment and any heavy earthmoving machinery defined in 29 CFR 1926.602(a) (1). These include scrapers, loaders, crawler or wheel tractors, excavators, backhoes, bulldozers, off-highway trucks, graders, agricultural and industrial tractors, and similar equipment.

Operator: A person who operates heavy equipment.

Ground Personnel/Workers: Personnel required to perform work on foot near/adjacent to heavy equipment operations (Note: operators are considered ground personnel when outside of the equipment cab).

3.0 GENERAL REQUIREMENTS

Field operations that involve heavy equipment represent a significant hazard to ground workers as well as heavy equipment operators. Heavy equipment may cause serious injury or death as a result of rollover, contact with ground personnel, and pinch points. All personnel working at or visiting a site where heavy equipment operations occur will read and abide by the requirements of this procedure.

3.1 Communications

Communication between heavy equipment operators, and other site personnel is a key method of preventing serious injury or death during heavy equipment operations. The following outlines the communication requirements during heavy equipment operations:

Site supervisors/managers will ensure that all operators are notified/informed of when, where, and how many ground personnel will be working on-site. All ground personnel will be made aware before changes are made in the locations of designated areas.

- If required to work near heavy equipment, ground personnel will use industry standard hand signals to communicate with operators.

- Always maintain eye contact with operators to the greatest extent possible (always face equipment). Never approach equipment from a blind spot or angle.
- All heavy equipment will be equipped with reverse warning devices (i.e., backup alarms) that can be significantly heard over equipment and other background noise. Reverse signaling lights will be in working order.
- When feasible, two-way radios will be used to verify the location of nearby ground personnel.
- When an operator cannot adequately survey the working or traveling zone, a guide will use a standard set of hand signals to provide directions. Flags or other high visibility devices may be used to highlight these signals.

3.2 Clearance

Ground clearance around heavy equipment may significantly reduce hazards posed during heavy equipment operations. The following outline the clearance requirements during heavy equipment operations:

- Ground personnel will always yield to heavy equipment.
- Ground personnel will maintain approximately 100 feet of clearance from all active heavy equipment, unless an approved, job-specific hazard analysis (JHA) that identifies any special precautions is completed and communicated to the appropriate operators and ground personnel.
- Heavy equipment operation areas will be designated, and all ground personnel will be aware of designated areas. Designated areas will include boundaries and travel routes for heavy equipment. Travel routes will be set up to reduce crossing of heavy equipment paths and to keep heavy equipment away from ground personnel.
- When feasible, physical barriers (e.g., caution tape, orange cones, and concrete jersey barriers) will be used to designate areas and ensure that unauthorized ground personnel do not enter such areas.
- Operators will stop work whenever unauthorized personnel or equipment enter the designated area and only resume when the area has been cleared.
- Operators will only move equipment when aware of the location of all personnel and when the travel path is clear.
- Ground personnel will never stand between two pieces of heavy equipment or other objects (e.g., steel support beams, trees, buildings).
- Ground personnel will never stand directly below heavy equipment located on higher ground.
- If working near heavy equipment, ground personnel will stay out of the travel and swing radius areas (e.g., excavators, all-terrain forklifts, hoists) of all heavy equipment.

- Ground personnel will never work near heavy equipment during times of inadequate lighting.
- Personnel will keep all extremities, hair, tools, and loose clothing away from pinch points and other moving parts on heavy equipment.

3.3 Personal Protective Equipment

At a minimum, all ground personnel and operators outside of heavy equipment will wear the following:

- High-visibility, reflective safety vest that is visible from all angles and made of fluorescent material and orange, white, or yellow reflective material (ensure that vest is not faded or covered with outer garments, dirt, etc.)
- American National Standards Institute (ANSI)-approved hard hat
- ANSI-approved safety glasses with side shields
- ANSI-approved steel-toed safety boots
- Hearing protection (as needed)
- Appropriate work uniform (i.e., full length jeans/trousers and a sleeved shirt; no tank, crew tops, or other loose clothing permitted)

3.4 Utilities

When contacted by heavy equipment, aboveground and underground utilities may cause severe injuries or death from electrocution, explosion, etc. The following outlines the requirements while performing heavy equipment operations that may lead to contact with aboveground or underground utilities:

- Always be aware of surrounding utilities.
- Ensure all equipment (e.g., dump trailers, loaders, excavators) is lowered prior to moving underneath of aboveground utilities.
- Ensure utilities are cleared and identified prior to beginning any earthmoving operation. Contact the local utility service providers for clearance prior to performing work.
- Follow the applicable requirements outlined in HS 402 Excavation and Trenching, and in utility location requirements.

4.0 HEAVY EQUIPMENT REQUIREMENTS

4.1 Training

- Only designated, qualified personnel will operate heavy equipment.
- Operators will have all appropriate local, state, or federal licenses or training to operate a designated piece of heavy equipment.

- Operators will be evaluated through documented experience (resume) and a practical evaluation of skills (field tests). Operators will be knowledgeable and competent in the operation of a designated piece of heavy equipment.

4.2 Inspections and Maintenance

- All heavy equipment will be inspected and, if necessary, repaired prior to use. Operators will not operate heavy equipment that has not been cleared for use. A competent individual will certify all machinery and mechanized equipment to be in safe operating condition (Attachment 1) prior to on-site operation.
- Heavy equipment will be inspected to the manufacturer's recommendations (at a minimum) prior to each work shift. All defects will be corrected before the equipment is used on-site.
- Inspection records will be maintained at the site. If a manufacturer's or company-specific inspection checklist is not provided, use the Heavy Equipment Preoperation Inspection Checklist (Attachment 2).
- Defective heavy equipment will be immediately taken out of service until repaired.
- Heavy equipment will be maintained and operated in accordance with the manufacturer's specifications and recommendations (e.g., speed restrictions, load limits, inspections).
- Personnel will never service heavy equipment in an unsafe or hazardous situation (e.g., do not crawl under the raised dump body during an inspection/service of a dump truck).
- Windows and windshields will be kept free from obstructions and dirt. Windows will not be cracked or visibly broken. All cab glass will be safety glass or equivalent that introduces no visible distortion.
- Operators will keep the cab, deck, rails, steps, and rungs free of grease, oil, mud, ice, and other debris.
- Heavy equipment will be equipped with overhead protection to guard the operator from falling objects.
- Heavy equipment will be equipped with a rollover protective structure meeting all Occupational Safety and Health Administration (OSHA) requirements.
- Heavy equipment will be equipped with seats belts that meet the requirements of the Society of Automotive Engineers Guidelines. Seat belts must be worn while operating heavy equipment.
- Heavy equipment will be equipped with a tagged, fully-charged fire extinguisher.
- Scissor points on front end loaders and other heavy equipment will be guarded appropriately.

4.3 Operation

- Heavy equipment will be operated in a safe manner that will not endanger persons or property.
- Heavy equipment will be operated at safe speeds.
- Always move heavy equipment up and down the face of a slope. Never move equipment across the face of a slope.
- Slow down and stay as far away as possible while operating near steep slopes, shoulders, ditches, cuts, or excavations.
- When feasible, operators will travel with the load trailing if the load obstructs the forward view of the operator.
- Slow down and sound horn when approaching a blind curve or intersection. Flagmen equipped with two-way radio communications may be required to adequately control traffic.
- Operators will remain in cab while heavy equipment is being loaded.
- Always keep heavy equipment in gear while in operation. Do not place in neutral.
- Heavy equipment will be shut down prior to and during fueling. Do not smoke or use electrical devices while fueling. Fuel will not be carried in or on heavy equipment, except in permanent fuel tanks or approved safety cans.
- Turn off heavy equipment, place gear in neutral and set parking brake prior to leaving vehicle unattended. Also, place all buckets and blades on the ground and place hydraulic gear in neutral. Heavy equipment parked on slopes will have the wheels chocked.
- Never jump on to or off from a piece of heavy equipment.
- Never exit heavy equipment while it is in motion.
- Passengers will only ride in heavy equipment designed for occupancy of passengers.
- Never ride on the outside of a piece of heavy equipment (e.g., tailgates, buckets, steps).
- Site vehicles must be parked in a safe place away from heavy equipment.
- Operators will never push/pull stuck or broken-down equipment unless a spotter determines that the area is cleared of all personnel around and underneath the equipment.
- Operators will always wear seatbelts while operating heavy equipment.
- If designated for work in contaminated areas/zones, equipment will be kept in the exclusion zone until work or the shift has been completed. Equipment will be decontaminated within designated decontamination areas. During work in exclusion zones where the potential exists for intrusive activities that may unearth unknown materials (e.g., drums, containers) and/or potentially contact unexploded

ordnance (UXO), heavy equipment operations will use remote methods, blast shield, and enhanced communications.

- Equipment left unattended at night adjacent to traveled roadways will have appropriate lights or reflectors, or barricades equipped with appropriate lights or reflectors, to identify the location of that equipment, and will not be closer than 6 feet (or the regulatory requirement for the work location) to the active roadway.
- Pneumatic-tired earthmoving haulage equipment, with a maximum speed exceeding 15 miles per hour, will be equipped with fenders on all wheels.
- Lift trucks will have the rated capacity clearly posted on the vehicle, and the ratings will not be exceeded.
- High lift rider industrial trucks will be equipped with overhead guards.
- When ascending or descending grades over 5%, loaded trucks will be driven with the load upgrade.
- All belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains, or other reciprocating, rotating, or moving parts of equipment will be guarded when exposed to contact by persons or when they otherwise create a hazard.
- All hot surfaces of equipment, including exhaust pipes or other lines, will be guarded or insulated to prevent injury and fire.
- All equipment having a charging skip will be provided with guards on both sides and open end of the skip area to prevent persons from walking under the skip while it is elevated.
- Platforms, footwalks, steps, handholds, guardrails, and toeboards will be designed, constructed, and installed on machinery and equipment to provide safe footing and access ways.
- Substantial overhead protection will be provided for the operators of fork lifts and similar equipment.

4.4 Fueling and Batteries

- Only the type and quality of fuel recommended by the engine manufacturer will be used.
- A well-ventilated area will be used for refueling.
- Fuel tanks will not be filled while the engine is running. All electrical switches will be turned off.
- No one will spill fuel on hot surfaces. Any spillage should be cleaned before starting an engine.
- Spilled fuel will be cleaned with cotton rags or cloths; do not use wool or metallic cloth.
- Open flame, lighted smoking materials, or sparking equipment will remain well away from the fueling area.

- Heaters in carrier cabs will be turned off when refueling the carrier or the drill rig.
- Portable fuel containers will not be filled completely to allow expansion of the fuel during temperature changes.
- The fuel nozzle will be kept in contact with the tank being filled to prevent static sparks from igniting the fuel.
- Portable fuel containers will not travel in the vehicle or carrier cab with personnel.
- Fuel containers and transfer hoses will be kept in contact with a metal surface during travel to prevent buildup of a static charge.
- Batteries will be serviced in a ventilated area while wearing appropriate personal protective equipment (PPE).
- When a battery is removed from a vehicle or service unit, the battery will be disconnected ground post first.
- When installing a battery, connect the battery to ground post last.
- When charging a battery, loosen cell caps prior to charging to permit gas to escape.
- When charging a battery, turn off the power source to the battery before either connecting or disconnecting charger loads to the battery posts.
- Spilled battery acid will be immediately flushed off the skin with a continuous supply of water.
- Should battery acid get into the eyes, the eyes will be flushed immediately with copious amounts of water and medical attention sought immediately.
- To avoid battery explosions, the cells will be filled with electrolytes. A flashlight (not an open flame) will be used to check water electrolyte levels. Avoid creating sparks around battery by shorting across a battery terminal. Lighted smoking materials and flames will be kept at least 25 feet away from battery-charging stations.

5.0 ATTACHMENTS

Attachment 1- Certification Form for Machinery and Mechanized Equipment

Attachment 2- Heavy Equipment Preoperation Inspection Checklist

6.0 REFERENCE

HS 402 Excavation and Trenching

Attachment 1

Certification Form for Machinery and Mechanized Equipment

Project Managers are responsible for ensuring all equipment is certified and that this machinery and mechanized equipment certification form has been submitted by equipment owners.

General Guidelines

Equipment will comply with all applicable requirements for motor vehicles and material handling heavy equipment contained in 29 CFR 1926 Subpart O. Heavy equipment includes, but is not limited to, drill rigs, front end loaders, backhoes, trackhoes, bulldozers, forklifts, and similar equipment used for the implementation of the project statement of work.

Equipment Safety Inspections

The following presents general guidelines for certifying equipment is in safe operating condition before activities commence at the site and during site operations. The following guidelines are not meant to be all-inclusive.

- A competent individual will certify all machinery and mechanized equipment are in safe operating condition (using the attached form) prior to on-site operation
- Equipment will be inspected daily by the owner/operator, and daily logs will be maintained. All discrepancies will be corrected prior to placing the equipment in service.
- Inspections will include, but are not limited to all hydraulic lines and fittings for wear and damage, all cable systems and pull ropes for damage and proper installation, exhaust systems, brake systems, and drill controls.
- Drill rigs and related support equipment and vehicles will be inspected by the driller in charge daily. These inspections will be recorded on the daily drill rig checklist or on equivalent subcontractor forms.
- Exhaustive preventive maintenance will be conducted for all equipment according to manufacturer recommendations and/or the subcontractor's internal policies, schedules, and equipment standard operating procedures.
- Machinery and mechanized equipment will be operated only by designated qualified persons.
- Maintain records of tests and inspections. Those records will be kept on-site and will be made available upon request of the designated authority and will become part of the official project file.
- Equipment not found to be in safe operating condition or when a deficiency which affects the safe operation of the equipment is found, the equipment will immediately be taken out of service and its use prohibited until safe conditions have been corrected.

- All equipment will be kept in the exclusion zone until work or the shift has been completed. Equipment will be decontaminated within designated decontamination areas.
- Equipment with an obstructed rear view must have an audible alarm that sounds when equipment is moving in reverse.

Attachment 2
Heavy Equipment Preoperation Inspection Checklist

To: Date:

From:

Project Name: Project Location:

1. This form provides certification of machinery and mechanized equipment to be used on the referenced project for the following work:

Description of equipment work:	
Project site:	
Subcontractor providing equipment: Address:	
Dates (duration) of equipment work:	

2. Inspection and certification of machinery and mechanized equipment, as required, has been made prior to, but within seven calendar days advance of, use on the project site. Recertification will be required for equipment that is used on the project site for more than one year.

	Identification of equipment (make, model, serial no.)	Date of Certification
1		
2		
3		

3. The above-listed equipment has been inspected and tested (as indicated above) and is CERTIFIED TO BE IN SAFE OPERATING CONDITION BY THE FOLLOWING COMPETENT INDIVIDUAL:

Name		Title	
Company			
Signature		Date	

4. If there are any questions regarding this certification, please contact:

HS 505 Safe Operation of Forklifts

Health & Safety Procedures

Procedure: HS 505
Date: February 2018
Revision: 1

HS 505 SAFE OPERATION OF FORKLIFTS

1.0 PURPOSE

All forklift use must conform to the procedures and requirements listed below and outlined in the Occupational Safety and Health Administration (OSHA) Standard for Forklifts 29 CFR 1910.178.

2.0 OPERATOR AND EQUIPMENT REQUIREMENTS

2.1 Operators

Personnel who operate a forklift must meet the following qualifications. Current copies of each operator's driver's license, training documentations, and industrial lift truck card will be maintained in the Site files.

2.1.1 Initial Qualification

Prior to being permitted to operate a forklift, the operators of forklifts must provide a copy of a valid state driver's license and a valid industrial lift truck card issued by an authorized source. Personnel who do not possess the industrial lift truck card must complete initial operator training, which addresses the following elements:

- The method for properly performing a daily preoperational forklift inspection
- Rules for operating powered industrial trucks, and an explanation of why these rules exist
- An emphasis on loading and unloading, center of gravity, stability, and mechanical limitations
- A combination of oral, written, and operational performance tests which adequately demonstrate the operator's ability to safely use a forklift (OSHA requires a formal, hands-on evaluation of the forklift operator.)

Upon completion of this training the operator will be awarded an industrial lift truck card.

On-Site Training: Before initial operation of a forklift on any job site, the Site Safety Officer (SSO) or designated alternate must instruct each new operator in the nature of hazards associated with the work site, any special requirements or hazards of the operator's particular work area, and the local guidelines for performing work safely.

2.1.2 Periodic Refresher Training

Refresher training will be provided for each forklift operator every three years or when there is reason to believe that there has been an unsafe operation.

2.2 Forklifts

All forklifts operated by personnel will conform to the following requirements:

- Those manufactured after June 1998: Part III, ASME B56.1-1993, Safety Standard for Low Lift and High Lift Trucks
- Those manufactured before June 1998: Part II, ANSI B56.1-1975, American National Standard for Powered Industrial Trucks

Approved forklifts must bear a label or some other identifying mark indicating conformance with the applicable standard.

Under both standards, manufacturers are required by federal regulation to equip forklifts with certain mandatory features, such as lights and an operator-controlled warning device (e.g., a horn) to warn others when the truck is approaching locations where vision is obstructed. Other mandatory features include the following:

- Overhead protection to guard the operator from falling objects
- A manufacturer's capacity plate, including the truck's maximum rated capacity stenciled on the mast and on both sides of the truck body
- Seat belts (for all forklifts, except those designed only for operation while standing)

These features must be present and operable on any forklift used by personnel.

3.0 OPERATIONS PROCEDURES

Forklift operators will observe the following requirements in their use of forklifts.

3.1 Preoperational Inspection

Prior to the first use of any forklift on any work shift, the operator will conduct an inspection prior to operating to ensure the following parts, equipment, and accessories (as applicable) work and are free of apparent damage:

- General condition and cleanliness
- Fire extinguisher (present and charged)
- Engine oil level, fuel level, radiator water level (liquid propane gas [LPG], gas and diesel forklifts).

- Battery (fully charged; check cables for exposed wires; battery plug connections not loose, worn, or dirty; vent caps not clogged; electrolyte levels in cells; hold downs or brackets keep battery securely in place)
- Bolts, nuts, guards, chains, or hydraulic hose reels (not damaged, missing, or loose)
- Wheels and tires (wear, damage, and air pressure, if pneumatic tires)
- Forks (forks not bent, no cracks present, positioning latches in good working condition, carriage teeth not broken, chipped, or worn)
- Chain anchor pins (not worn, loose, or bent)
- Fluid leaks (no damp spots or drips)
- Hoses (held securely; not loose, crimped, worn, or rubbing)
- Warning devices (horn is working and loud enough to be heard in working environment; other warning devices operational)
- Lights (headlights and warning lights operational)
- Foot brake (pedal holds, unit stops smoothly)
- Parking brake (holds against slight acceleration)
- Deadman seat brake (holds when operator rises from seat)
- Clutch and gearshift (shifts smoothly with no jumping or jerking)
- Dash control panel (all lights and gauges work)
- Steering (moves smoothly)
- Lift mechanism (operates smoothly—check by raising forks to maximum height then lowering forks completely)
- Tilt mechanism (moves smoothly, holds—check by tilting mast all the way forward and backward)
- Cylinders and hoses (not leaking after above checks)
- Any unusual sounds or noises

The inspection will be documented using the Forklift Preoperation Inspection Checklist (Attachment 1). Each checklist is valid for a one-week period, and will be maintained with the forklift. At the end of each week all checklist forms will be collected and submitted to the SSO or designated alternate for review and filing. If any malfunctions or defects are found during the inspection, the forklift will be parked (with the keys removed), placed out of service, and the SSO will be notified to arrange servicing and repair.

3.2 Operating Rules

The requirements below apply to all forklift use.

3.2.1 Driving a Forklift

- Operate forklifts only in designated areas with adequate ventilation.
- Do not exceed the floor load rating.
- Secure (i.e., tie down) unstable loads before starting the vehicle.
- Decrease speed at all corners, sound horn, and watch the swing of both the rear of the lift truck and the load.
- Keep arms and legs inside the forklift structure, except when signaling for turns or stops.
- Do not jump from or out of a moving forklift.
- Make sure there is adequate clearance before passing under or between structures.
- Maintain indoor speed under 5 mph and outdoor speed under 15 mph.
- Yield to pedestrians.
- Do not carry passengers, except where factory-installed seats are provided.
- Tilt the mast back before traveling.
- Stay at least three vehicle lengths back when following another forklift.
- Maintain forks about 4 to 6 inches above the driving surface when traveling.
- Do not attach slings, cables, or chains to the forks to lift objects from underneath them.
- When forward vision is obscured, drive in reverse.
- Do not leave a forklift parked with an elevated load.
- Do not park a forklift without turning off the power, placing all the controls in the neutral position, and setting the parking brake. A forklift is considered unattended if the operator is out of sight of the truck or more than 25 feet away.
- Observe all traffic signals.
- Do not use a forklift to tow or push other forklifts, other vehicles, or other equipment.
- Use pneumatic-wheel forklifts when traveling on irregular terrain and on surface streets. Use hard-wheel forklifts indoors only.
- Maintain at least a 10-foot separation from overhead power lines.
- When crossing rails or other irregular areas, slow down and approach diagonally.
- Move to the right side of the lane when traveling on roads to allow passing vehicles adequate clearance. Pull over and stop when necessary.
- Mount a "Slow Moving Vehicle" sign (triangle) to the rear of forklifts approved for road use when traveling off-site.

3.2.2 Handling Loads

- Keep the mast of the forklift in an upright position before inserting the forks into a pallet.
- Level the fork before inserting it into the pallet.
- Insert the fork all the way under the load.
- Adjust the fork as wide as possible to fit the load and to provide a more even distribution of weight.
- Space the fork evenly from the center stringer of the pallet to balance the load.
- Do not protrude the fork past the back of a pallet when stacking in tight areas.
- Place tines as wide as possible for the load and lock them in place to prevent sideways movement.
- Never add a counterweight to balance an overload; know the weight of the load.
- Do not exceed the forklift's rated capacity.
- Do not lift material or equipment you are unfamiliar with.
- Ensure that the load is secured before moving. If it is not, pile the load again or strap the load to skid.
- Ensure that loads on pallets are stable, neat, cross-tied if possible, and evenly distributed.
- Remove damaged pallets from service.
- Do not raise or lower the fork unless the lift truck is stopped and the brake is applied.
- Lift loads straight up or tilt back slightly.
- Do not lift a load that extends above the load backrest unless no part of the load can possibly slide back toward the operator.

3.2.3 Parking

The requirements below apply when parking forklifts:

- Park on level surfaces.
- Lower the forks to the ground.
- Tilt the mast forward.
- Set the parking brake.
- Place the controls in the neutral position.
- Turn off the engine.
- Chock the wheels if the truck must be parked on a slope.

3.2.4 Loading Docks

The driver is responsible for the following requirements when operating a forklift on a loading dock:

- Ensure at least one trailer wheel is chocked before driving onto or into a truck trailer.
- Drive the forklift slowly on wet and slippery docks.
- Slow down and sound your horn when proceeding through doorways.
- Stay clear of edges of docks, rail cars or ramps. Have edges clearly marked.
- Do not operate forklifts inside vehicles for long periods without ventilation.
- Make sure that the dock plate is properly secured and can support the load before driving over it. (Load weight should be clearly marked. Drive carefully and slowly over the dock plate; do not spin wheels.

3.2.5 Ramps

The driver is responsible for the following requirements when operating a forklift on ramps:

- Point the forks up the ramp when carrying a load, regardless of the travel direction.
- Drive unloaded forklifts with the forks pointing downhill for added stability.
- Obtain help to guide you when going up a ramp with a load and your vision is blocked.
- Never turn a forklift sideways on a ramp.

3.2.6 Refueling

Refuel gasoline, diesel, and propane fuel-powered forklifts outdoors only. Close the valve for the propane bottle while the engine is running to consume all gas in the line. The engine shall be turned off whenever refilling fuel tanks, and shall not be restarted until the fuel cap is replaced.

Recharge electric forklift batteries only in designated, posted, and well-ventilated areas. Do not conduct spark-producing operations while batteries are being charged. Operator personnel will not perform battery maintenance.

Employees are not permitted to smoke during refueling/recharging.

3.3 Indoor Operations

The following requirements apply where forklifts are operated indoors:

- Adequate ventilation is needed for forklifts powered by internal-combustion engines.
- Only use forklifts with the appropriate classification in areas with explosives or flammable gases.

- The horn should be sounded when approaching intersections, pedestrians, doors, or corners. Slow down and sound the horn anywhere vision is blocked or impaired.
- Electric forklifts are preferred for indoor operations and required when working in confined spaces.

3.4 Pedestrian Areas

Pedestrians working nearby should be sure to keep a safe distance from forklifts. This means staying clear of the forklift's turning radius and making sure the operator knows where all pedestrians are.

The operator will yield the right-of-way to pedestrians, prevent anyone from walking or standing under elevated forks, and sound the horn as a warning when approaching personnel.

4.0 MAINTENANCE ACTIVITIES

4.1 Semiannual Inspection

Every six months, a manufacturer-certified mechanic will inspect each forklift. A qualified inspector will also inspect all new, altered, modified, or extensively repaired forklifts prior to initial use.

- Qualified inspectors will inspect and load-test all assigned forklifts annually to 100% of their rated capacity.
- A nondestructive test (NDT) will be performed on any forklift suspected of an overloading incident. This test will be performed on the forks, carriage, mast, and at other stress points.
- Inspectors will furnish written reports showing test procedures and confirming the adequacy of repairs or alterations. These reports will be maintained in the project files.
- Inspectors will load-test the tines of forklifts used for explosives annually to 100% of their rated capacity. Every three years, following the load-test, the trucks will undergo an NDT to detect if there are any conditions that may weaken the tines.

Records of the annual inspections will be maintained in the project files and will include the following information:

- The date the inspection was performed
- The name of the service provider
- Any items identified for corrective action
- Dates when corrective actions were completed and when the forklift was returned to service

4.2 Maintenance Safety

- Only qualified persons will be allowed to service and maintain forklift equipment.
- Disconnect all batteries before doing any maintenance work.
- Before servicing LPG forklifts
  - shut off the tank fuel valve,
  - run the engine until it stops, and
  - disconnect the tank from the hose.
- Block the forklift securely when removing wheels.
- Support the forklift hood in upright position or remove to do work.
- Keep the work area clean and well lit.
- Clean spilled oil or hydraulic fluid immediately.
- Remove all tools and parts before starting the engine.
- Handle batteries with care. Avoid contact with battery terminals with hoisting chains, tools, and metal objects. Cover the battery top with insulating material.
- Attach a chain hoist to the counterweight before removing it from a forklift.
- Check the bolts holding the counterweight to the body and replace any worn or missing bolts.
- Do not leave parts, creepers, cans, tools, or other obstacles around.
- Do not start a forklift if it is on a lift hoist or wheel stands.
- Do not work on forklift attachments unless you are familiar with their operation.
- Do not work beneath elevated forklift trucks or forks unless they are securely supported by approved blocks.
- Do not run LPG, gas, or diesel forklifts in unventilated areas.

5.0 ATTACHMENTS

Attachment 1- Forklift Preoperation Inspection Checklist

Attachment 1
Forklift Preoperation Inspection Checklist

Forklift Preoperation Inspection Checklist															
Forklift Information															
Number/Name:							**Make/Model:**								
Checklist items - operator must initial each item (Unsat items require corrective action prior to forklift use)															
Hour Meter Reading															
Check the following as appropriate	Operator Name Date:			Operator Name Date:			Operator Name Date:			Operator Name Date:			Operator Name Date:		
	Sat	**Unsat**	**N/A**	**Sat**	**Unsat**	**N/A**	**Sat**	**Unsat**	**N/A**	**Sat**	**Unsat**	**N/A**	**Sat**	**Unsat**	**N/A**
1. Operator qualified to operate forklift															
2. Overhead guard															
3. Horn															
4. Lights															
5. Parking brake															
6. Service brakes															
7. Steering															
8. Oil level															
9. Radiator fluid level															
10. Major fluid leaks															
11. Mast and forks (tines)															
12. Backup alarm															
13. Tires (visual)															
14. Seat belts															
15. Fuel leaks (liquid or propane)															
16. Fire extinguisher full and secure															
17. Fuel lines secure															
18. Electrical lines															
19. Exhaust components															
Comments/Remarks															

HS 508 Fire Extinguishers and Suppression Systems

HS 508 FIRE EXTINGUISHERS AND SUPPRESSION SYSTEMS

1.0 PURPOSE

This procedure establishes the minimum requirements necessary for selecting, placing, using, and inspecting fire extinguishing and detection equipment and complies with Occupational Safety and Health Administration (OSHA) General Industry Standard 29 CFR 1910.157.

2.0 SCOPE

Personnel will not attempt to fight or control a fire unless they have had sufficient training, previous experience or hands-on expertise. Training classes, previous experience, expertise, etc. needs to be reviewed and approved by the SSO.

3.0 PROCEDURE

3.1 Portable Fire Extinguishers

Portable extinguishers will be selected based on the following classifications:

Classification	Type of Fire
Class A	Combustible materials
Class B	Flammable liquid, gas or grease
Class C	Electrical equipment
Class D	Combustible metal

The portable extinguishers in use will not contain an active agent or propellant with vapor toxicity equal to or greater than the following:

- Carbon tetrachloride
- Chlorobromomethane
- Azeotropic chloromethane
- Dibromodifluoromethane
- 1,2-dibromo-2-chloro-1, 1,2-trifluorothane
- 1,2-dibromo-2,2-difluorothane
- Methyl bromide
- Ethylene dibromide

- Hydrogen bromide
- Methylene bromide
- Bromodifluoromethane

Any extinguishers that contain any of the above ingredients, or whose ingredients have vapor toxicity equal to or greater than the above chemicals, will be removed from service.

The number of Class A extinguishers will be based on the following:

	Light (low) Hazard Occupancy	**Ordinary (moderate) Hazard Occupancy**	**Extra (high) Hazard Occupancy**
Minimum rated single extinguisher	2-A	2-A	2-A
Maximum floor area per unit of A	3,000 sq. ft.	1,500 sq. ft.	1,000 sq. ft.
Maximum floor area for extinguisher	11,250 sq. ft.	11,250 sq. ft.	11,250 sq. ft.
Maximum travel distance to extinguisher	75 ft.	75 ft.	75 ft.

The availability of Class A extinguishers can be satisfied with the use of extinguishers with multiple ratings (e.g., Class A, B, and C). In addition, where automatic sprinkler systems are present, the maximum floor area for each extinguisher does not apply; however, the 75-foot travel distance does.

Class B extinguishers will be provided according to the severity of the hazard as listed below:

Type of Hazard	**Basic Minimum Extinguisher Rating**
Light	5B, 10B
Ordinary	10B, 20B
Extra	20B, 40B

An open tank in a building having flammable liquids in depth exceeding ¼ inch will be provided with sufficient extinguishers to provide one numerical unit of Class B or each square foot of tank surface area, the minimum extinguisher being a 5B (using labels after June 1, 1969). So, for example, a tank with a surface area of 50 square feet would require two Class 20B (or one 40B) and one Class 10B extinguisher. For tanks exceeding 100 square feet in surface area, a fixed extinguisher will be provided, in addition to sufficient portable extinguishers for the numerical unit of Class to equal 100 (e.g., two Class 40B and one Class 20 B).

- All Class B extinguishers will be located on the same floor as the hazard, with a travel distance of no more than 50 feet. For widely separated hazards (e.g., boiler rooms, paint storage areas, kitchens), a separate extinguisher for each class of hazard will be provided if the travel distance is more than 25 feet.
- Class C extinguishers (one 15-pound carbon dioxide or equivalent) will be provided within 25 feet of a high hazard area containing an electrical distribution source such as a generator, transformer, or main switchgear. Also, the extinguisher size and locations will be determined based on the expected type of fire (combustible-Class A, or flammable-Class B) as noted above.
- A Class D extinguisher for the specific type of combustible metal will be kept within 25 feet of the area where the metal is machined or processed.
- Fire extinguishers will be located and installed as follows:
    - Located where it is readily seen and easily accessible. If an obstruction is unavoidable, then a sign indicating the location of the extinguisher, and/or color symbol (e.g., red markings) will be used.
    - If extinguishers of different classes (e.g., one Class A and one Class B) are stored together, then they will be marked using stencils or signs indicating clearly for which type of fire each will be used.
    - If an extinguisher contains an electrically conductive agent (e.g., water), it will be clearly labeled with a sign that states "Not for Electrical Fires" with letters visible from at least three feet away.
    - Extinguishers will not be left on the floor, but will be hung on a wall, column or other appropriate support, or be of the wheeled or cart type. Extinguishers of not more than 40 pounds will be hung so that the top is not more than 5 feet above the floor. Extinguishers greater than 40 pounds will be hung so that the top is not more than 3½ feet from the floor. The bottom of the extinguisher will not be less than 4 inches from the floor.
    - Extinguishers will be suitable for use at temperatures of 40 degrees to 120 degrees Fahrenheit. Therefore, the locations mounted will allow for maintenance of the extinguishers within the temperature range.
    - Extinguishers will be tested and recharged by qualified contractors as required by the applicable federal and/or state OSHA General Industry Safety Standards.

3.2 Fixed Fire Equipment

- The design of fixed fire protection equipment will be reevaluated whenever the occupancy changes (e.g., increases) or the fire hazards increase.
- Fixed fire protection systems will be installed in all areas inside buildings where flammable liquids are mixed, dispensed or applied, or used for washing or quenching, except in the following cases:
    - A dip tank holding less than 150 gallons or having a surface area of less than 4 square feet, or both.
    - As dispensed from approved safety containers of 5 gallons or less.

- Sprinkler heads will not be painted or coated.
- An automatic sprinkler will be replaced every 50 years or earlier if it shows evidence of corrosion, leakage, or damage.
- Sprinklers will be installed or removed only using a sprinkler wrench designed specifically for that purpose.
- Pipe hangers will be replaced or repaired when broken or loose.
- New sprinkler systems will be designed and installed as required by applicable safety standards.
- Fire detection systems will be located away from or by other means protected from mechanical or physical damage.

3.3 Inspection of Fire Equipment

3.3.1 Inspection, Maintenance, and Testing of Portable Extinguishers

- Extinguishers will be inspected monthly to ensure they are still in the proper location, have not been used or tampered with, are still properly charged, and that they have no obvious external damage. The initials of the inspector, and the date of inspection, will be noted on the tag attached to the extinguisher.
- Any extinguisher showing damage will be replaced.
- A thorough inspection will be performed annually by personnel specifically trained in the inspection (e.g., extinguisher supplier).

3.3.2 Inspection, Maintenance, and Testing of Fixed Systems

- Fixed fire protection equipment will be inspected and maintained by personnel specifically trained in the specific procedures to perform these tasks.
- Records of the testing and inspection of fixed systems will be maintained for at least three years.
- Sprinkler systems will be tested as follows:
  - Annually – perform a main drain flow test
  - Every two years – open the inspector's test valve to ensure the system operates properly.
- Any hose and standpipes will be inspected annually by appropriately trained personnel.
- Test fire detection systems (e.g., smoke alarms) on an annual basis, and record the results of the test. This testing will be performed by personnel specifically trained to do the testing.

HS 509 Manlifts and Aerial Lifts

HS 509 MANLIFTS AND AERIAL LIFTS

1.0 PURPOSE

Manlifts and aerial lifts are rented, leased, or subcontracted to carry out specific activities in support of projects where they are used to provide personnel access to areas necessary for sampling, testing, or other observations and activities. All use of manlifts and aerial lifts shall conform to the requirements below and applicable provisions of 29 CFR 1910.67 and 29 CFR 1926.453. The Project Manager will maintain copies of equipment and operator certifications and other relevant inspection and maintenance records as described below as part of the project records.

2.0 GENERAL REQUIREMENTS

- All manlifts/aerial lifts must be certified by the manufacturer to meet requirements of the American National Standards Institute (ANSI) standard applicable to the device:
  - For truck-mounted boom or scissor lifts – ANSI Standard 92.2
  - For manually propelled boom or scissor lifts – ANSI Standard 92.3
  - For self-propelled boom lifts – ANSI Standard 92.5
  - For self-propelled scissor lifts – ANSI Standard 92.6
- Lift controls on extensible and articulating boom platforms shall be clearly identified as to function.
- Manlifts/aerial lifts primarily designed as personnel carriers shall have both work platform (primary) and lift mount (secondary) controls. Primary controls shall be within easy reach of the operator. Secondary controls shall be able to override upper controls. All controls shall be plainly marked to identify their function.
- Appropriate fall protection must be used by all occupants/operators of manlift and/or manlift/aerial lift equipment.

3.0 INSPECTION AND MAINTENANCE

All manlift/aerial lifts used by personnel will be inspected in accordance with the following requirements.

3.1 Preoperational Inspection

The operator of any manlift/aerial lift will perform a preoperation inspection of the equipment prior to its first use during a work shift. The Project Manager will assign a worker to observe and document the inspection by the operator. Attachment 1 provides a preoperational checklist for

personnel to use during inspection. During the inspection, the operator will ensure that the equipment is free of visible defects or hazards and all operational controls are fully functional. The items below are to be checked during this inspection:

- All welds between cylinders and booms for cracks or wear
- All pivot pins for security of their locking devices
- All exposed cables, sheaves, and leveling devices for wear and secure attachment
- Hydraulic system for frayed hoses and leaks
- Lubrication and fluid levels
- Boom and basket for cracks or abrasions
- Load capacity posting

Operate boom from ground controls through one complete cycle. Check for unusual noises and uncontrolled movements.

If any problems are noted, the manlift/aerial lift will be placed out of service until the operator has fully rectified all unusual conditions and deficiencies. The Project Manager will be notified of the deficiencies and the operator's plan for repairing or rectifying the deficiencies. Repairs or rectifications are to be documented and the records maintained as a part of the project records.

3.2 Periodic Maintenance Inspection

At least annually, each manlift/aerial lift still in use will be inspected by a manufacturer-certified mechanic to ensure that it is properly functioning and maintained. Records of the annual inspections of rented aerial lifts will be maintained by the site and will indicate the following:

- The date the inspection was performed
- The name of the service provider
- Any items identified for corrective action
- Dates when corrective actions were completed and when the aerial lift was returned to service

4.0 TRAINING

Only trained and authorized persons will operate a manlift/aerial lift. Training will include the following:

- Explanations of electrical, fall, and falling object hazards
- Procedures for dealing with hazards
- Recognizing and avoiding unsafe conditions in the work setting
- Instructions for correctly operating the lift (including maximum intended load and load capacity)

- Demonstrations of the skills and knowledge needed to operate an aerial lift before operating it on the job
- When and how to perform inspections
- Manufacturer's requirements

4.1 Retraining

Personnel should be retrained if any of the following conditions occur:

- An accident occurs during aerial lift use
- Workplace hazards involving an aerial lift are discovered
- A different type of aerial lift is used

5.0 OPERATIONS PROCEDURES

5.1 General Requirements

The following requirements pertain to any use of manlift/aerial lift equipment:

- Any person working must wear a full-body harnesses and lanyard. The lanyard must be attached to an approved attachment point when the lift is in operation or maintained in an elevated position. Personnel working from aerial lifts shall not tie off belts or harnesses to adjacent poles, structures, or equipment.
- The load in any boom/basket must not exceed the manufacturer's specified limits for the equipment.
- Personnel working in baskets shall always stand on the floor of the basket and may not sit or climb on the edge of the basket or use planks, ladders, or other devices for a work position. Using ladders, planks, or other objects positioned in the aerial lift to gain greater height is prohibited
- Manlifts/aerial lifts will be positioned on ground that is stable and provides a secure base for the equipment and anticipated load. Outriggers must be used and placed on pads or on solid surfaces.
- Brakes on manlifts/aerial lifts shall be set when in use. When using manlifts/aerial lifts on inclined surfaces, wheel chocks shall be used if they can be safely installed.
- Lift mount (secondary) level controls will not be operated without permission from the operator in the aerial lift, unless the operator is incapacitated.
- Manlifts/aerial lifts shall not be moved along the ground with personnel in an elevated basket unless the equipment is specifically designed for this operation. Before moving a manlift/aerial lift for travel, the boom must be properly cradled and the outriggers stowed. Ladders on ladder trucks and tower trucks shall be secured in the lower traveling position by the locking device on top of the truck

cab, and the manually operated device at the base of the ladder before the truck is moved for highway travel.

- Do not work above other workers. Clear the area below using cones or other visible indicators; in moving traffic situations use signs placed at least 50 feet away from the work zone in either direction to warn drivers.
- Secure all tools or other items to prevent drops. Do not throw tools to or from an elevated work platform.
- Workers shall not exit from an elevated work platform onto any other elevated surface.
- Work on manlifts/aerial lifts will be stopped and the platforms lowered and secured if wind speeds exceed 25 miles per hour or lightning is occurring within 3 miles of the work area or if thunder is heard 30 seconds after lightning is noted.
- If electric welding operations will occur, ensure that the manlift/aerial lift has been prepared by disconnecting the positive and negative terminals of the battery before initiating the weld. **Do not use any part of the manlift/aerial lift as a ground for electric welding operations.**
- Manlifts and/or aerial lifts will not be operated near live electrical wiring. The following minimum separation distance will be maintained between any portion of a lift equipment and any energized electrical component, unless operated by a certified electrical worker for the express purpose of performing electrical work.

Nominal Voltage (Kilovolts)	Minimum Safe Working Distance
0–50	10 feet
over 50–75	11 feet
over 75–125	13 feet
over 125–175	15 feet
over 175–250	17 feet
over 250–370	21 feet
over 370–550	27 feet
over 550–1000	42 feet

5.2 Boom Lifts

In addition to the general requirements above, the following requirements apply specifically to operation of boom lifts:

- Do not enter or leave a bucket by walking on the boom.

- Do not use boom lifts as a crane or for lifting/handling loads.
- Do operate all controls slowly to ensure smooth platform movement.
- Do not attach or suspend elevated baskets from any other object.

5.3 Scissor Lifts

In addition to the general requirements in Section 1.0, the following requirements apply specifically to operation of scissor lifts.

- Scissor lifts and other platform-type man lifts shall be used only with proper railings and toeboard installed.
- When moving a self-propelled scissor lift, the operator must first position themselves on board the work platform.
- Towering (i.e., movement of the lift with the platform elevated) is prohibited.

6.0 ATTACHMENTS

Attachment 1- Manlift and Aerial Lift Preoperational Checklist

Attachment 1

Manlift and Aerial Lift Preoperational Checklist

The aerial lift operator must complete this form at the beginning of each shift.

Date: _____ Equipment #: _____ Hour Meter: _____

Inspection	OK	Not OK	N/A	Notes
Basic inspection (from ground):				
Operator's manual (in place)				
Platform/railing (not bent, worn, damaged)				
Tires (not worn, proper pressure, bolts)				
Fire extinguisher (fully charged, sealed)				
Horn (operational, loud enough)				
Restraining device				
Hydraulic fluid level (platform down)				
Hoses (good repair)				
Internal combustion equipment:				
Propane tank (inspected, no leaks, secure)				
Fuel cap (secure)				
Engine oil (check with engine off)				
Radiator (check only when cold)				
Hydraulic fluid (platform down)				
Hoses and belts (good repair)				
Battery (tight connections, cell levels)				
Battery-powered equipment:				
Cables and connections (tight)				
Cell levels (above plates)				
Plugging control (smooth operation)				
Basic inspection (on lift):				
Brake pin & linkage				
Brake (firm, stops smoothly)				
Steering (smooth operation)				
Leaks				
Hydraulic controls (smooth operation)				
Hydraulic functions (up/down)				
Directional controls (smooth operation)				

Inspected by: _____ Signature: _____

HS 510 All-Terrain Vehicles

Health & Safety Procedures

Procedure: HS 510
Date: February 2018
Revision: 1

HS 510 ALL-TERRAIN VEHICLES

1.0 PURPOSE

Use of all-terrain vehicles (ATVs) shall conform to the requirements below.

2.0 GENERAL REQUIREMENTS

This procedure is intended to raise personnel awareness and to inform field personnel of the basic requirements for operating ATVs safely and responsibly during nonrecreational applications.

Many employees have practical experience riding ATVs for recreation; however, using them for construction and site maintenance tasks presents unique hazards personnel may not be familiar with. ATV operations can be dangerous if basic safety equipment is not used and/or the operator fails to maintain a safety-first attitude.

At a minimum, personnel must follow the guidelines specified in the equipment-specific ATV user/operator manual in the following areas:

- Vehicle training requirements
- Wearing the proper safety equipment
- Checking the mechanics of the vehicle before operating
- Starting the vehicle properly
- Safe operating guidelines

The following sections briefly describe each of these elements.

3.0 TRAINING

- All site personnel must be aware of and follow applicable local and state laws regarding ATV use, especially near active roadways. According to the Occupational Safety and Hazard Administration (OSHA), most citations issued are related to unauthorized equipment modifications, reckless driving, and not adhering to applicable state regulations, primarily associated with ATV safety features (e.g., lights, horns).
- Site-specific training is required to discuss safe operating guidelines, a formal review of the manufacturer's operating guidelines/requirements (for each ATV used), and the limitations and restrictions for use at the site (e.g., performing field task the ATV is not designed for, no operations within 50 feet of open vaults).

- All training must be documented and maintained in the project files for the duration of site activities. Tailgate or toolbox briefings can be used to refresh ATV operators. File all sign-in pages/forms.
- Site-specific control maps are recommended to illustrate where operators can and cannot operate ATVs.
- Because of the startling fatality/accident statistics, many states have implemented programs to promote safe behaviors and attitudes among operators. Enrollment in a free safety course is available at https://cbt.rohva.org/.

4.0 SAFETY EQUIPMENT

- **Head Protection** includes a helmet with face protection approved by the American National Standards Institute (ANSI), US Department of Transportation (DOT), or the Snell Memorial Foundation
- **Eye Protection** includes an ANSI-approved face shield in the helmet or ANSI-approved goggles or glasses
- **Body Protection** includes gloves and ANSI-approved work boots, long-sleeved shirts and long pants
- **Hearing Protection** includes using ear plugs if elevated noise is produced by ATV.

5.0 PRERIDE CHECK

- Check air pressure in tires, tighten axle nuts, and secure axle by cotter pin.
- Check throttle and breaks.
- Check ignition, headlights, and tail lights.
- Check oil and fuel levels.
- Inspect and adjust drive-shaft chassis; look for loose nuts and bolts.
- Do not operate if faulty equipment is discovered during the preride check.
- Service all fluid levels and equipment needing repairs prior to operating the ATV.

6.0 PROPER START

- Parking brake in place.
- “On” position for fuel cap vent/valve and ignition key (if applicable).
- Transmission in neutral.
- Engine stop switch should be in “run” or “start” position.
- If engine is cold, put the choke in “on” position before starting the ATV.

7.0 SAFE OPERATIONS

- Always follow manufacture specifications and user/operator manual.
- Investigate and locate visible hazards in the environment prior to performing ATV site activities.
- Be aware of other vehicle traffic.
- Regulate speed of ATV while on-site. If a governor is installed, do not tamper with or adjust.
- Do not allow a passenger on an ATV who is not trained in its operation.
- Never make after-market modifications to the equipment that may compromise the safety of the operator (e.g., welding additional brackets for material transport, altering hitch assembly).
- Know the limitations of the ATV, especially when performing unique tasks (e.g., landscaping/clearing, snow plowing, pulling cable or hose, hauling on uneven terrain).

Following the above guidelines during ATV use will greatly decrease the operator's risk of injury or accident. As with any equipment, the operation of ATVs must be taken seriously.

HS 511 Welding, Cutting, and Other Hot Work

HS 511 WELDING, CUTTING, AND OTHER HOT WORK

1.0 PURPOSE

To establish the minimum requirements for activities associated with welding, cutting, and hot work. Welding, cutting, and other hot work presents serious potential for igniting nearby flammable materials and potential explosions. Prior to the start of any welding, cutting, or other hot work, all affected persons must coordinate to ensure that this work will be carried out in compliance with safety requirements and to ensure that information related to potential flammable materials or atmospheres has been communicated and addressed. Documentation of this communication and evaluation are to be maintained as part of the project files.

2.0 SCOPE

This procedure applies in its entirety to all site activities.

3.0 DEFINITIONS

Hot Work: A work activity that by the nature of the operation (e.g., grinding, burning thermo cutting/welding) creates an open source of ignition.

Hot Work Control Areas: Fire-hazardous areas such as cable-spreading rooms, cable trays, conveyor galleries, rubber-lined piping equipment and structures, potentially explosive atmospheres, and similar hazardous hot work areas identified by project safety personnel.

Hot Work Permit: Document issued prior to the start of hot work, which is used to verify the presence of appropriate fire prevention and protection measures.

4.0 PROCEDURE

4.1 General Requirements

- Personnel is to comply with site-specific hot-work permitting and requirements.
- Equipment will be used only for operations for which it is approved and as recommended by the manufacturer. Welders assigned to operate or maintain oxygen/fuel-gas supply equipment and resistance welding equipment will be thoroughly instructed in the safe use of such equipment by a qualified person and tested in the field for competency prior to engaging in work.
- Before any cutting or welding is performed, the area will be inspected by the person responsible for authorizing hot work. When appropriate, a written Hot Work Permit (Attachment 1) will also be completed to designate specific approvals needed and precautions to be taken.

- Engineering controls will be implemented to control hot work hazards to the extent feasible.
- If welding cannot be conducted safely and/or in a manner to minimize risk to people and the environment, the welding/cutting operation will not be performed.

4.2 Gas Welding and Cutting Safety

- Fuel-gas hoses and oxygen hoses will be easily distinguishable from each other. The contrast will be made by different colors or by surface characteristics readily distinguishable by touch. Oxygen and fuel-gas hoses will not be interchangeable. A single hose having more than one gas passage will not be used.
- When parallel sections of oxygen and fuel-gas hose are taped together, not more than 4 inches out of 12 inches will be covered by tape.
- All hoses in use will be inspected at the beginning of each work shift. Defective hose will be removed from service.
- Hoses, cables, and other equipment will be kept clear of walkways, ladders, and stairs.
- Clogged torch tip openings will be cleaned with approved cleaning wires, drills, or other devices designed for this purpose.
- Torches to be used will be inspected at the beginning of each work shift for leaking shutoff valves, damaged hose couplings, and clogged tip connection. Defective torches will not be used.
- Torches will be ignited by friction lighters or other approved devices only. Matches, flame lighters, or hot work will not be used to ignite a torch.
- Oxygen and fuel-gas pressure regulators, including related gauges, will be in proper working order and equipped with flashback arrestors attached to the gauges. NOTE: Flashback arresters are in addition to backflow devices.
- All oxygen cylinders and fittings will be kept away from oil or grease. Cylinders, cylinder caps and valves, couplings, regulators, hose, and apparatus will be kept free from oil or greasy substances and will not be handled with oily hands or gloves. Oxygen will not be directed at oily surfaces or greasy clothes or used within a fuel oil or other storage tank or vessel.
- Torches and hoses will be completely depressurized (bled) of pressurized gas, prior to storage or at the end of each shift.
- Torches and hoses will not be stored in enclosed areas (e.g., gang boxes, lockers) while connected to cylinders, and gauges will be removed at the end of shift.
- Oxygen connections will include a means to prevent backflow.
- Fuel gas cylinders will have flashback protection.

4.3 Arc Welding and Cutting Safety

- Electrode holders that are designed for arc welding/cutting and are capable of safely handling the maximum rate current required will be used.
- Any current-carrying parts passing through the holder which the arc welder or cutter grips in his or her hand or the outer surfaces of the jaws of the holder, will be fully insulated against the maximum voltage encountered to ground.
- All arc welding/cutting cables will be completely insulated and flexible, capable of handling the maximum current requirements of the work.
- Only cables free from repair or splices for a minimum distance of 10 feet from the electrode holder will be used. Cables with standard insulated connectors or splices with insulating quality that is equal to that of the cable are permitted.
- If it is necessary to splice lengths of cable, insulated connectors equivalent to that of the cable will be used. If connections are made by cable lugs, they will be securely fastened together and provide a good electrical contact. Exposed metal parts of the lugs will be completely insulated.
- If electrode holders are left unattended, the electrodes will be removed, and the holder will be placed so they cannot make electrical contact with personnel or conducting objects.
- To avoid the possibility of electric shock, electrode holders will not be dipped in water.
- When the arc welder or cutter leaves work or stops work for any length of time or when the arc welding cutting machine is to be moved, the power supply to the equipment will be turned off.
- Any faulty or defective equipment will be reported to the supervisor and tagged "out of service" until repaired.
- All arc welding/cutting operations will be shielded by noncombustible or flameproof screens to protect personnel working in the vicinity from the direct ray of the arc.

4.4 Storage and Handling of Compressed Gas Cylinders

- Compressed gas cylinders will be legibly marked with either the chemical or trade name of the gas. Such markings will be stenciled, stamped, or labeled and will not be easily removable.
- The marking will be located on the shoulder of the cylinder.
- Compressed gas cylinders will be equipped with approved connections.
- Acetylene cylinders will be stored and used valve end up.
- Cylinders will not be stored near highly combustible/flammable materials, especially oil or grease.

- Cylinders will be stored in an upright and secure position with caps installed and separated from fuel-gas cylinders or combustible materials (especially oil or grease), by a minimum distance of 20 feet or by a noncombustible barrier at least 5 feet high and having a fire resistance rating of at least one-half hour.
- Cylinders will be not dropped, struck by objects, or permitted to strike each other violently.
- Cylinder valves will be closed and gauges will be removed at the end of the shift or when work is finished.
- Valves of empty cylinders will be closed.
- Cylinders will be kept far enough away from the actual welding/cutting operation so that sparks, hot slag, or flames will not reach them.
- Cylinder valves will always be opened slowly.
- An acetylene cylinder valve will not be opened more than 1½ turns of the valve stem and preferably no more than ¾ of a turn.
- Where a special wrench is required to operate a cylinder valve, the wrench will be left in position on the stem of the valve while the cylinder is in use. In the case of manifold or coupled cylinders, at least one such wrench will be available for immediate use.
- Regulators will be removed, valve caps in place, and valves closed when cylinders are transported by vehicles. All vehicles used to transport cylinders will have a proper support rack installed.
- A suitable cylinder truck, chain, or other steadying device will be used to prevent cylinders from being knocked over while in use or storage.
- Cylinders will not be placed where they may become part of an electric circuit. Tapping of an electrode against a cylinder to strike an arc is prohibited.

4.5 Personal Protective Equipment

Selection and use of personal protective equipment (PPE) will be documented in the task specific JSA.

4.5.1 Eye and Face Protection

Eye and face protection will comply with the following:

- Welding helmets and hand shields will be used during all arc welding/cutting operations, excluding submerged arc welding. Cutting/welding goggles will also be worn during arc welding/cutting operations. The goggles or glasses may be either clear or colored glass, depending on the type of exposure in welding operations. Helpers or attendants will wear proper eye protection.
- Safety goggles or other approved eye/face protection are for use during gas welding operations on light work, torch brazing, or inspection.

- All personnel on resistance welding or brazing equipment will use face shields or goggles, depending on the job.

4.5.2 Protective Clothing

Hot work will require the following protective clothing:

- All welders will wear flameproof gauntlet gloves.
- Flameproof aprons made of leather or other suitable material may also be desirable for protection against radiated heat and sparks.
- Woolen clothing will be worn in preference to cotton because it is not so readily ignited. Nylon clothing is not permitted for welding/cutting operations. All outer clothing, such as jumpers or overalls, will be reasonably free from oil or grease. Long sleeve shirts and long pants can be also substituted for jumpers/overalls.

4.5.3 Respiratory Protective Equipment

Respiratory protective equipment will comply with the following:

- Respiratory protective devices will be required when one or more of the following conditions exist:
  - Feasible engineering controls are insufficient to mitigate the hazards.
  - Room size (with special regard to ceiling height) is limited or welding/cutting work is extensive and ventilation is limited.
  - Several welders are working in the area at the same time.
  - Potentially unsafe atmospheric conditions exist.
  - Too much heat is generated.
  - Hazardous fumes, gases, or dusts of toxic metals (particularly lead, cadmium, chrome, beryllium, and zinc) are present in the base metal or in coatings.
- If needed, respiratory PPE will be selected, used, and maintained in accordance with the site respiratory protection program and documented in the JSA.

4.6 Mechanical Ventilation

- Mechanical ventilation will consist of either general dilution systems or local exhaust systems. Local exhaust systems are preferred.
- General mechanical ventilation will be of sufficient capacity and so arranged as to produce the number of air changes necessary to maintain welding fume and smoke within safe limits. The American Conference of Governmental Industrial Hygienists (ACGIH) provides guidelines for air changes based on contaminants, size of room, etc.
- General ventilation may not be used as the only means of control when toxic metals are involved in the operation.

- Local exhaust ventilation will consist of freely movable hoods intended to be placed by the welder or burner as close as practicable to the work. This system will be of sufficient capacity and so arranged as to remove fumes and smoke at the source and keep the concentration of them in the breathing zone within safe limits.
- Contaminated air exhausted from a working space will be discharged into the open air or otherwise clear of the source of intake air. Environmental regulations may require filtering or other cleaning of exhausted air.
- All makeup air will be clean and suitable for breathing.
- Oxygen will not be used for ventilation purposes, comfort cooling, blowing dust from clothing, or cleaning the work area.
- Appropriate methods and controls will be used in the case of specific requirements (including welding rods and fluxes, paints and coatings) for materials containing zinc, lead, mercury, beryllium, cadmium, and stainless steel to be cut, heated, and/or welded.

4.7 Fire Protection

- When possible, objects to be welded, cut, or heated will be moved to a designated safe location. If this is not possible, all movable fire hazards in the workspace will be taken away to a safe place.
- If the object to be welded, cut, or heated cannot be moved and all fire hazards cannot be removed (e.g., equipment, walls, floors), positive means will be taken to confine the heat, sparks, and slag to protect the immovable fire hazards as well as opposite sides.
- No welding, cutting, or heating will be done where the application of flammable paint, the presence of other flammable compounds, fumes/gases, or heavy dust concentrations create a possible hazard. If the potential exists for welding, cutting, and hot work that introduces the generation of airborne fumes, gases, dusts, etc., the following procedures/protocols will be implemented:
    - Develop a task hazard analysis (THA) to outline the sequence of steps, potential hazards, appropriate control measures, etc. to minimize exposure.
    - Isolate the work area and introduce ventilation measures.
    - Communicate to nearby personnel the activity and subsequent control measures taken to reduce airborne exposures.
    - Enroll affected personnel in a respiratory program per 29 CFR 1910.134 to include fit testing, medical clearance, training, etc.
- Wherever there are openings or cracks in the flooring that cannot be closed, precautions will be taken so that no sparks will drop through the floor. The same precautions will be taken in the presence of cracks or holes in walls, open doorways, and open or broken windows.

- Approved fire extinguishing equipment will be present and readily available in the immediate work area during all welding/cutting activities. A minimum of a 10-pound ABC fire extinguisher is required.

4.8 Fire Watch

- During all welding/cutting activities, a fire watch will be maintained for at least 30 minutes after completion of welding/cutting operations so that possible smoldering fire can be detected and extinguished.
- Firewatchers will have fire-extinguishing equipment readily available and be trained in its use.
- Firewatchers will be familiar with facilities and procedures in the event of a fire. They will watch for fires in all exposed areas and attempt to extinguish them only when obviously within the capacity of the equipment available. The fire department will be immediately notified of all fires.

4.9 Welding/Cutting on Containers

- No welding, cutting, or other hot work will be performed on empty drums, barrels, tanks, or other containers until they have been thoroughly cleaned and it has been documented both visually and with direct reading instruments (DRI) there is no residue and that a potential flammable/explosive atmosphere does not exist. (This is to ensure that there are no flammable materials present or any substances such as greases, tars, acids, or other materials which, when subjected to heat, might produce a hazard.) Any connection to the drum or vessel will be disconnected or blanked off.
- All hollow spaces, vacancies, or containers will be ventilated to remove gases before preheating, cutting, or welding. Purging with inert gas is recommended if DRI indicates the potential for flammable gases in the action level range if attempts at cleaning and ventilation are unsuccessful.
- In addition to the requirements presented in HS 118 Confined Space Entry Program, welding/cutting in confined spaces such as a tank, boiler, pressure vessel, or small compartment will require the following precautionary measures:
    - Local exhaust ventilation will be provided, unless workers wear supplied-air respirators.
    - Gas cylinders and/or welding machines will be placed outside the confined space.

4.10 Manifolding of Cylinders

- Cylinder manifolds will be installed under the supervision of an experienced person(s) and must comply with proper practices in construction and use.
- All manifolds and parts will be appropriate for the gases for which they are approved.

- When acetylene cylinders are manifolded, approved flashback arresters will be installed between each cylinder and the coupler block. One flash arrestor installed between the coupler block and regulator is acceptable only for outdoor use or if the number of cylinders coupled does not exceed three.
- Each cylinder lead will be provided with a backflow check valve.

5.0 ATTACHMENTS

Attachment 1- Hot Work Permit

6.0 REFERENCE

HS 118 Confined Space Entry Program

ATTACHMENT 1 Hot Work Permit

Section/Location:	Good for this date only:
Specific vessel or equipment:	
Work to be done:	

Atmospheric Testing - State exact location of test	Time	% LEL	% O2	Other	Other	Other

Checklist	Initial	
	Yes	Does not apply
Client representative has been informed of the work to be done		
Operations/plant personnel have been informed of the work to be done		
All tanks/lines/valves are disconnected, blinded, or locked out		
Equipment and all attached piping has been cleaned and purged with water___, steam___, inert gas___ , or air___		
Electrical service has been locked out and tagged		
All grounding and bonding wires are in place		
Surrounding equipment and operations are safe for hot work		
No open vessels or lines are within 35 feet of hot work area		
Fire watch has been provided by contractor		

Personal Protective Equipment[1]

Eyes	**Body**	**Extremities**	**Respiratory**	**Fire Protection Equipment**
☐ Shaded goggles	☐ Coveralls	☐ Welding gloves	☐ None	☐ ABC 10-pound fire extinguisher
☐ Welder's shield	☐ Leather apron	☐ Hard hat	☐ ½-Face APR	☐ Charged water hose
☐ Other -	☐ Other -	☐ Boots	☐ Full-face APR	☐ Fire blanket
		☐ Other -	☐ Other -	☐ Other -

Special Instructions

Completed by: _____ Approved by: _____

1 Selected PPE must provide workers with adequate protection from heat, hot slag and fire. PPE worn during normal environmental activities (e.g., Tyvek® coveralls) is not acceptable.

HS 517 Traffic Safety

Health & Safety Procedures

Procedure: HS 517
Date: July 2018
Revised: 0

HS 517 TRAFFIC SAFETY

1.0 PURPOSE

This procedure outlines the guidelines to protect personnel working on or near roadways. Because each traffic situation is likely to be unique, the methods described in this procedure should be used as guidelines to develop a task-specific traffic plan for each individual situation.

2.0 SCOPE

The following guidelines can be used as a basis for managing traffic during work operations on or near roadways. The specific procedures for each task will require developing a specific traffic control plan that will be attached to the JSA. Depending on the nature of the traffic plan, local permits and approvals may also be required.

3.0 PROCEDURE

This procedure describes the methods for protecting workers and the public in or near roadways. Typical methods include work practices, signs, signals, and barricades. When reasonable traffic control methods will not adequately control traffic at work zones or construction sites, flaggers will be required.

Whenever possible, place a work vehicle between your work site and oncoming traffic. This will act as a large, visible warning sign, and should an oncoming car should fail to yield or deviate, the parked vehicle (rather than your body) will absorb the first impact of a crash. Always leave some room between the vehicle and the work zone so that, if the vehicle is struck, it is not pushed into the work area or personnel. Turn the vehicle wheels so that if it is struck, it will swing away from the work site. In addition, proper personal protective equipment (such as hard hats and high-visibility vests) will be worn during traffic operations.

If work in the road is necessary, place the work vehicle facing oncoming traffic and set the parking brake. If subsurface work is planned (e.g., manhole entry) park downwind whenever possible to prevent exhaust from entering the work zone. Turn off the engine when possible. Always leave some room between the rear of the vehicle and the work zone. Even though the vehicle would protect you in a crash, it might be knocked several feet backwards. Turn the headlights on (night or day).

Strobe (Beacon) Lights on Vehicles: Strobe lights, when used properly, will warn oncoming vehicles of the activities.

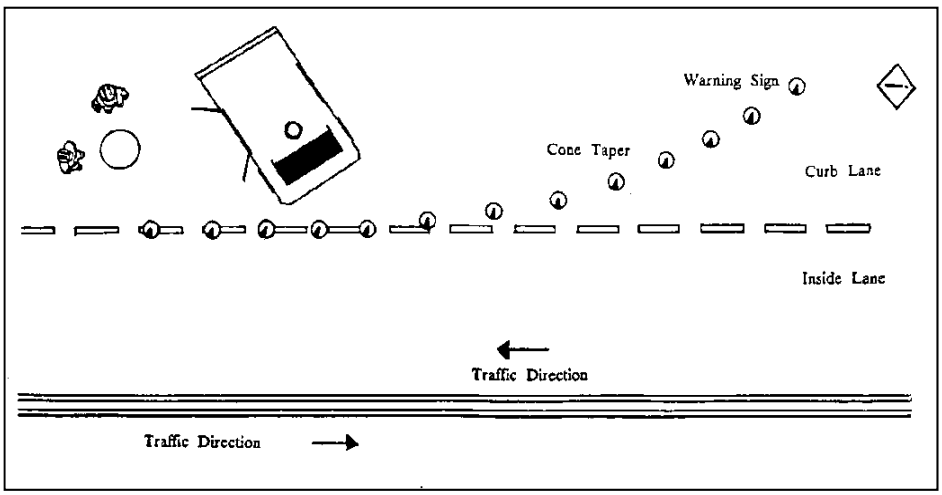
Use of Signs and Cones to Direct Traffic: Traffic signs and cones are used to direct traffic away from and around you. Cones and signs are only effective when they are clear in giving direction and when they give oncoming drivers enough time to react.

Signs and Traffic Control Devices: In addition to cones, signs are required in almost all traffic control situations. The most commonly required signs are listed below.

- "Road Work Ahead" or "Workers Ahead" are the basic warning signs. They are orange, a minimum of 48" x 48" square, and equipped with a self-supporting base. In general, advanced signs should be placed well ahead of the cone taper to warn traffic of the upcoming controls.
- Directional Arrow signs should be placed ahead of the cone taper to clearly indicate which direction traffic should flow.
- Use a "Road Work Ahead" sign instead of warning flags. Warning flags have no legal status and are not recommended.

Note: Always remember that signs and cones cannot protect you; they can only guide traffic. Do not assume that it is safe to work behind the vehicle or to walk beside the vehicle inside a line of cones. Parking the vehicle in a slight angle (as shown in the next example) allows safer access to the side doors and completely blocks the entire lane.

Cone Positioning: The most common coning situation is setting a taper of cones that creates a visual barrier for oncoming motorists and gradually closes a lane. The position of the taper depends on the road width, position and size of the work area, and the characteristics of the traffic.

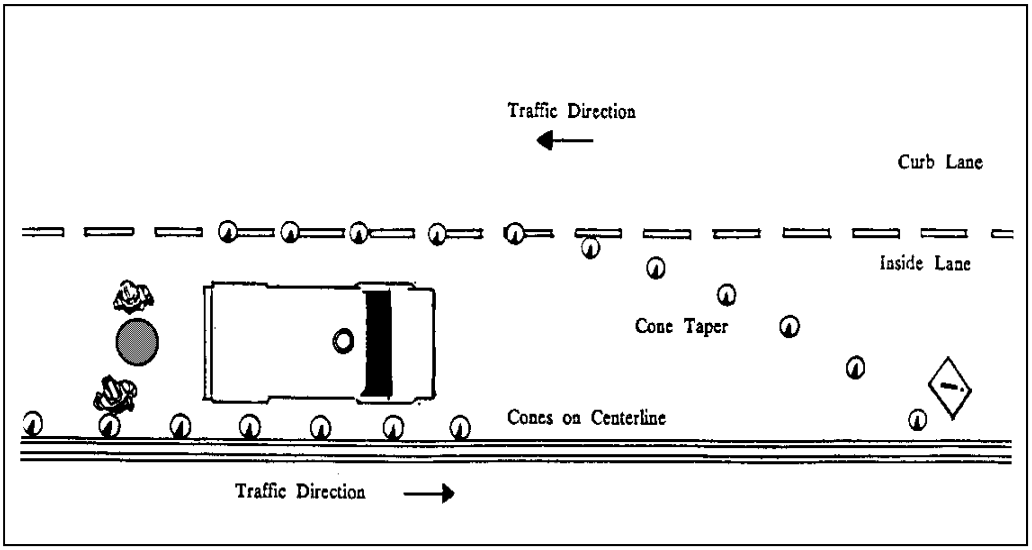


The basic curb lane setup. Note the warning sign, cone taper, and vehicle placement.

It is critical that vehicles not only avoid the workers and equipment in the road but also that they have a safe, clearly understood place to go once you have diverted them.

Never use cones to divert vehicles into oncoming lanes. Such diversions are unsafe without flaggers to control the flow of the opposing vehicles. Often there is room for a vehicle to straddle the centerline, taking up only part of the lane in each direction and leaving room for traffic to pass by on each side. In this case, two cone tapers, one for each direction of traffic, must be set. Only work off the back of the vehicle with this setup.

When diverting traffic out of part of a lane, divert vehicles toward the center of the road if there is room between the cone taper and the centerline of the road. This is less risky than diverting them close to parked cars.



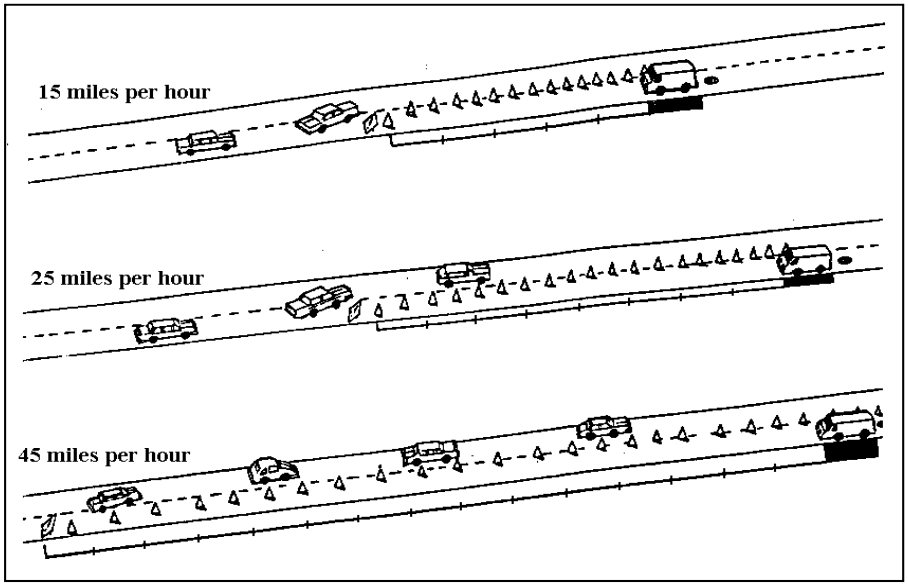
Coming off the inside lane. The line of cones on the centerline alerts traffic coming from the opposite direction.

- Always try to provide drivers with the best line of sight to see the hazards and solutions. At low traffic speeds, drivers can often sort out their own right-of-way solutions, but only if they can see the other key vehicles.
- If another lane is available, cone off the whole lane where conducting work. Cars may try to squeeze by two abreast if it is not clear that one lane is completely occupied and the open lane is single width.

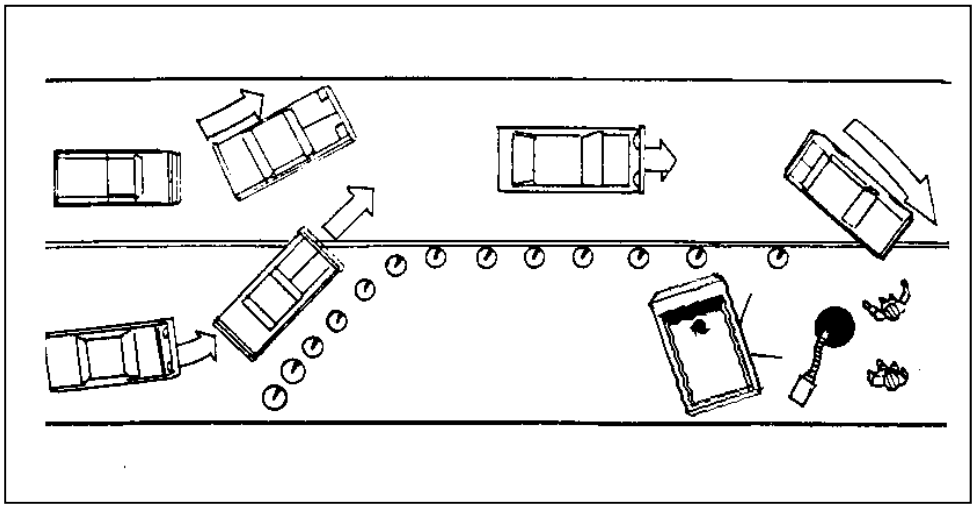
Cone Taper Length: The length of the cone taper depends on the type of traffic and the approach speed of the traffic. On state roads and major highways with speeds above 35 mph, the dimensions are often regulated by law. If not specified by law or a permit, the following table provides guidance to be used for the cone taper length.

Traffic Speed		Distance[1] of Initial Sign		Cone Spacing	
mph	kmh	feet	meters	feet	meters
15	24	50–90	15.2–27.4	3–15	.914–4.57
25	40	90–150	27.4–45.7	3–25	.914–7.62
30	48	135–200	41.1–60.9	3–30	.914–9.14
35	56	150–240	45.7–73.2	3–35	.914–10.7
40	64	190–300	57.9–91.4	3–40	.914–12.2
45	72	240–360	73.2–109.7	3–45	.914–13.7

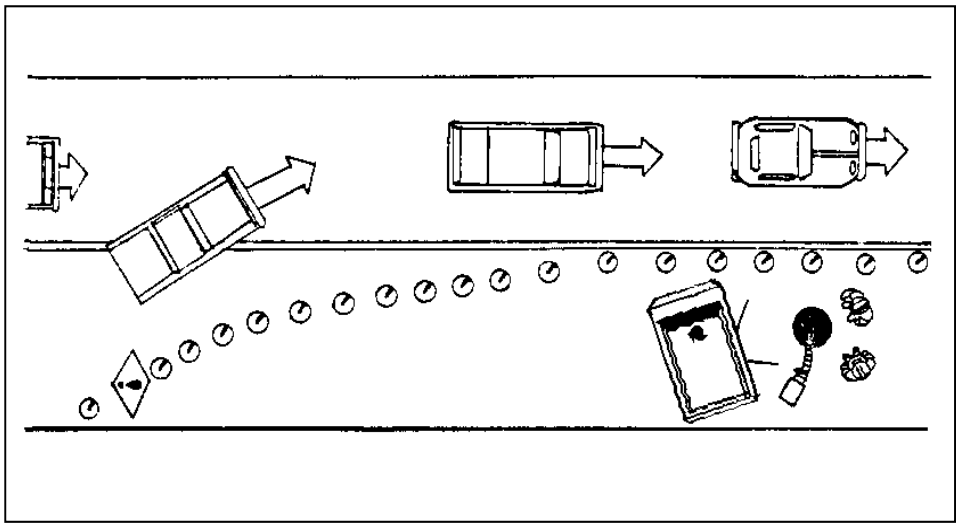
1. These distances are based on dry, rough surfaces. The distance of the initial sign should be greater for wet or slick surfaces. Verify these with your local and state regulations.



Traffic speed and cone taper length. The faster the oncoming traffic speed, the longer the cone taper must be. Although local regulations vary, the illustration above shows the general rule at 15 mph, 25 mph, and 45 mph. Note how the spacing between the cones increases as oncoming traffic speed increases



Wrong. In this illustration, the cone taper is too short. Traffic must change lanes abruptly, causing disruption.



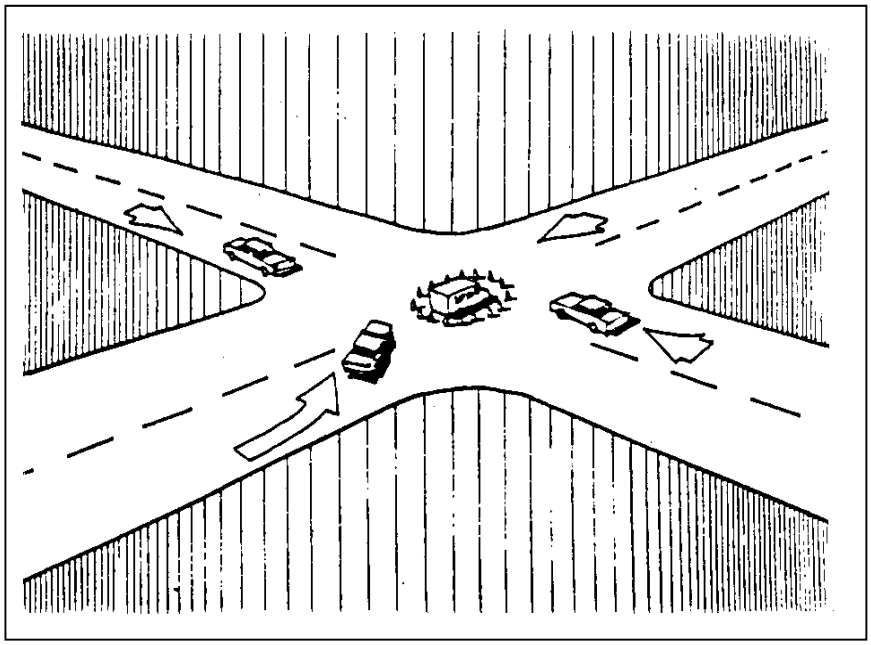
Correct. In this illustration, cones are tapered gradually, allowing cars to change lanes and merge easier. Note that cones are extended past the work site.

The following are additional guidelines that apply to setting a cone taper:

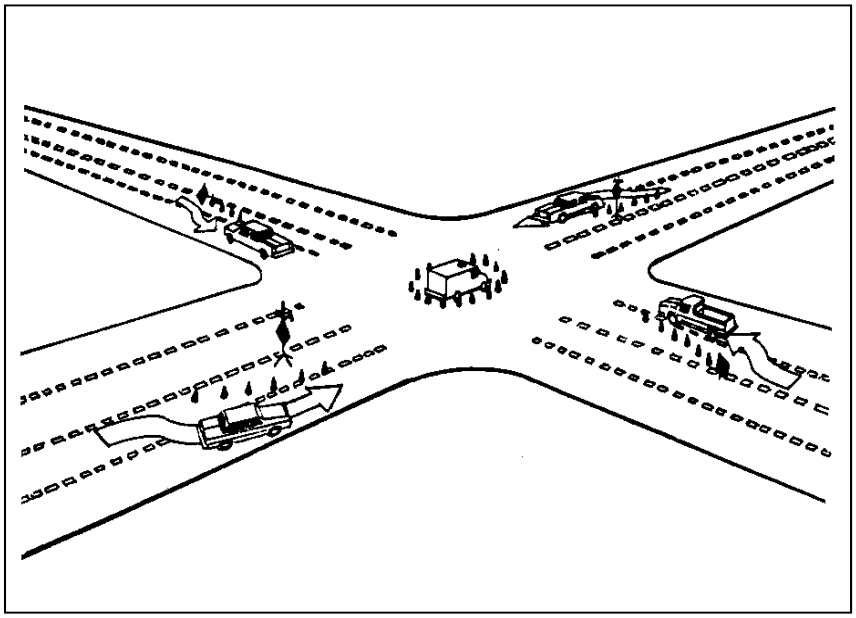
- Carry the taper of cones past the vehicle and the work area and behind the vehicle. Otherwise, vehicles may turn back into the lane once past the vehicle and injure someone.
- Intersections, side streets, and side entrances (and the amount of traffic to and from them) affect the length and shape of cone tapers.
    - At major intersections, sometimes it is necessary to put a lead taper of cones even farther away, beyond an intersection. Drivers approaching an intersection typically focus on that intersection and tend not to notice traffic control just beyond it. They also typically speed up to make a light. By placing your first taper

of cones on the far side of an intersection, you focus their attention on the traffic control and adjust them to your presence with sufficient warning.

- Side street or building entrances that bring traffic through the normal protected zone of a cone taper may require a second taper to prevent that traffic from turning directly into the protected lane.

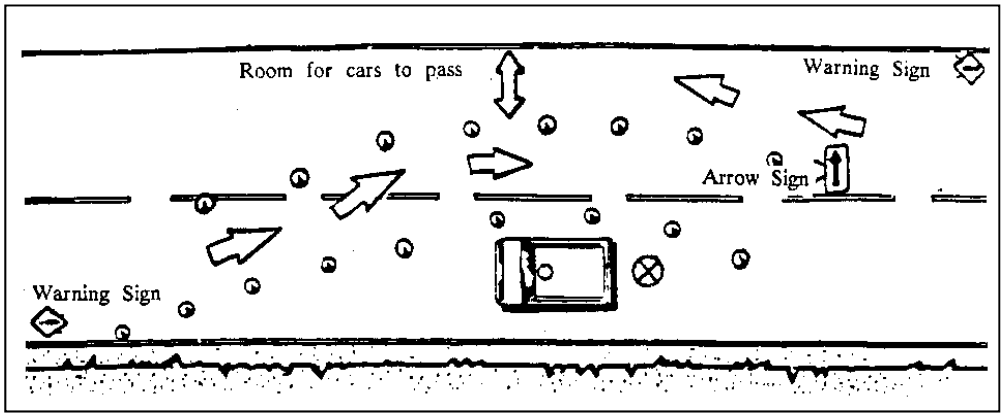


T**he wrong approach**. The single ring of cones gives oncoming traffic little warning, and no clue of how to react.

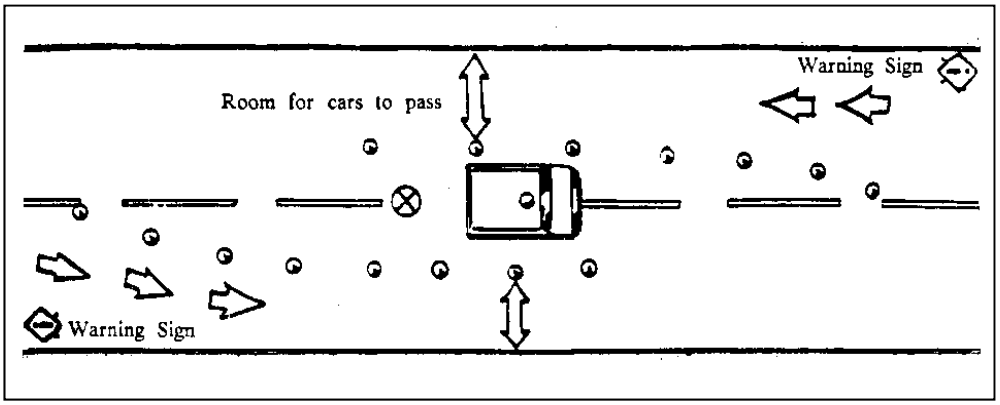


A better approach. Oncoming traffic is warned and controlled by cones and signs outside of the intersection.

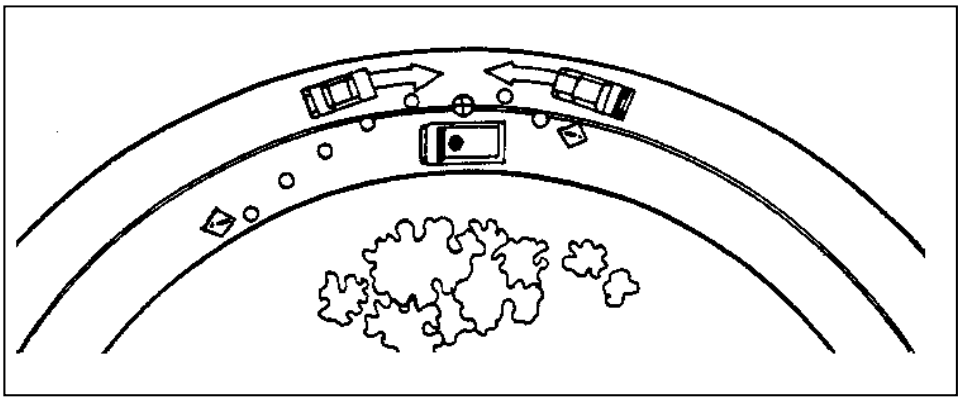
- In lightly traveled residential streets and crowded urban side streets where traffic speeds are low, it may be most practical to shorten the cone taper. Typically, this would occur where it is best to minimize the risk to vehicles which are diverted around you and exposed to oncoming cars.
- The maximum spacing between channeling cones in a taper should be approximately equal in feet to the speed limit in mph. For example, the cones on a road with a 55-mph speed limit should be spaced a maximum of 55 feet apart. Cones placed on a tangent to keep traffic out of a closed lane should be spaced in accordance with the extent and type of activity, the speed limit of the road, and the vertical and horizontal alignment of the road so that it is obvious that the road is closed to traffic.

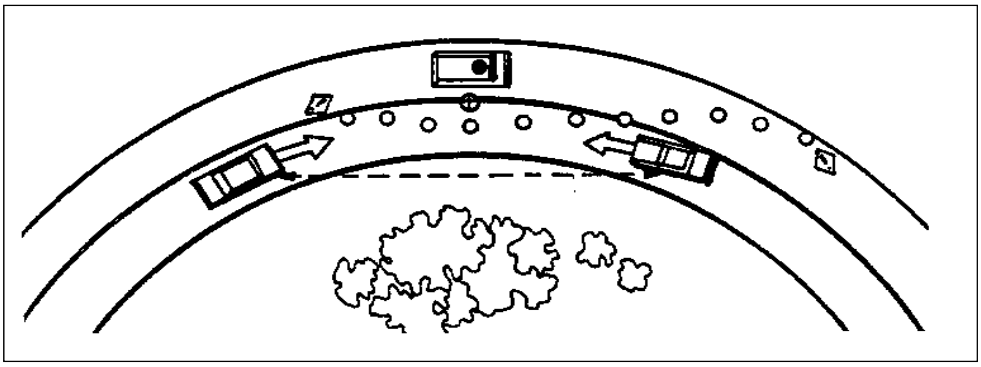


Diverting traffic into oncoming lane. Traffic may be diverted into oncoming lanes without flagger control only if traffic is light, there is room for cars to pass in both directions, and there is proper control moving cars into artificial passing lanes. Note the warning signs in both directions, the use of the arrow sign, and the creation of two lanes using cones.

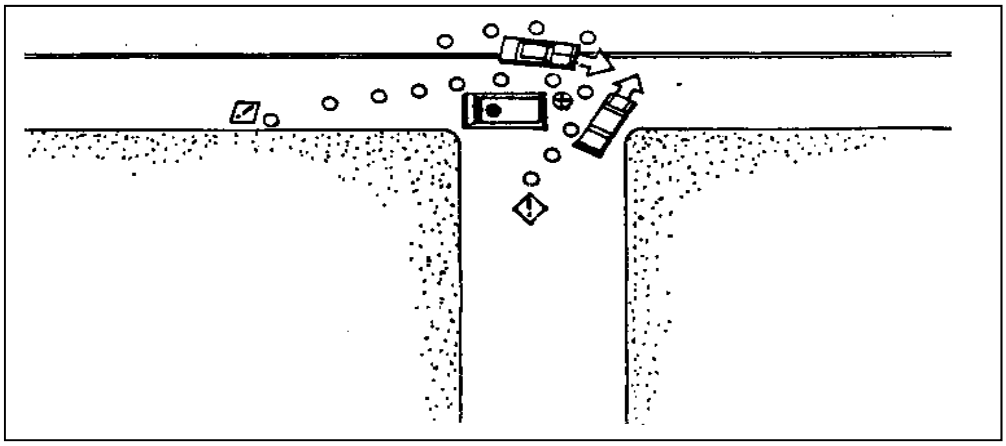


Working on the road centerline. Traffic must be controlled and diverted in both directions if the worksite is on the road centerline. Traffic must be moved to the outside of the road. Leave room for cars to pass between the cones and the curbs of both lanes.

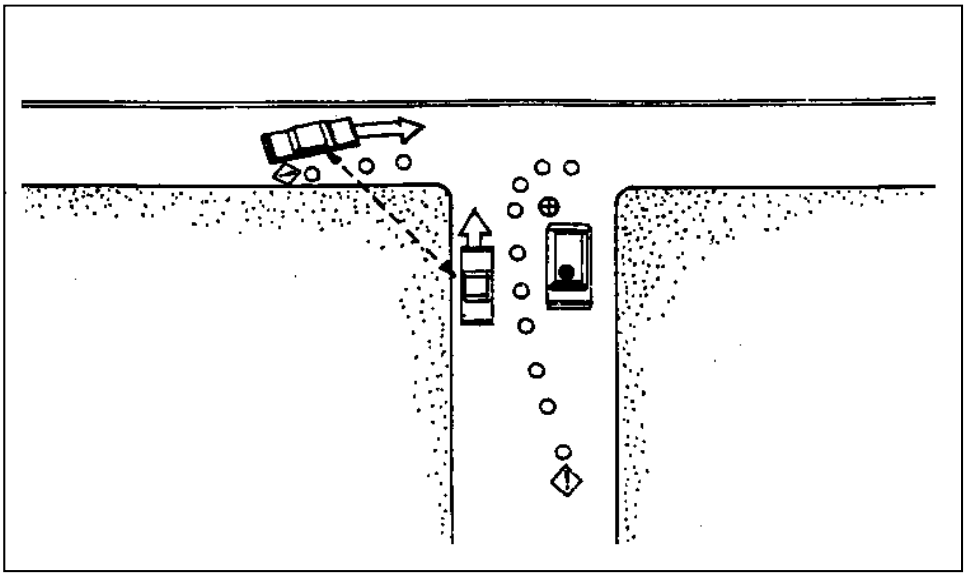




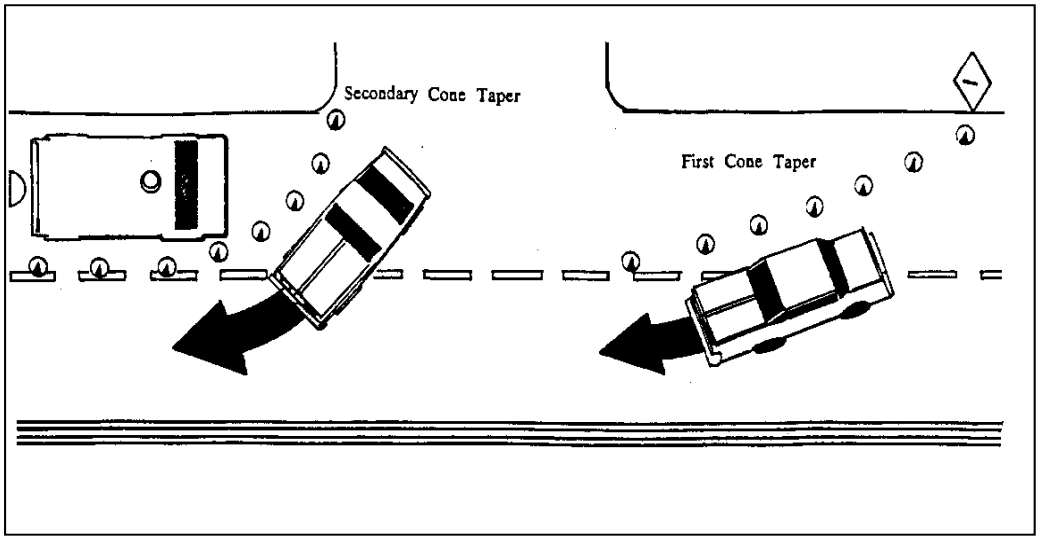
Even with line of site established around the curve, two way traffic sharing the same lane requires flagger control.



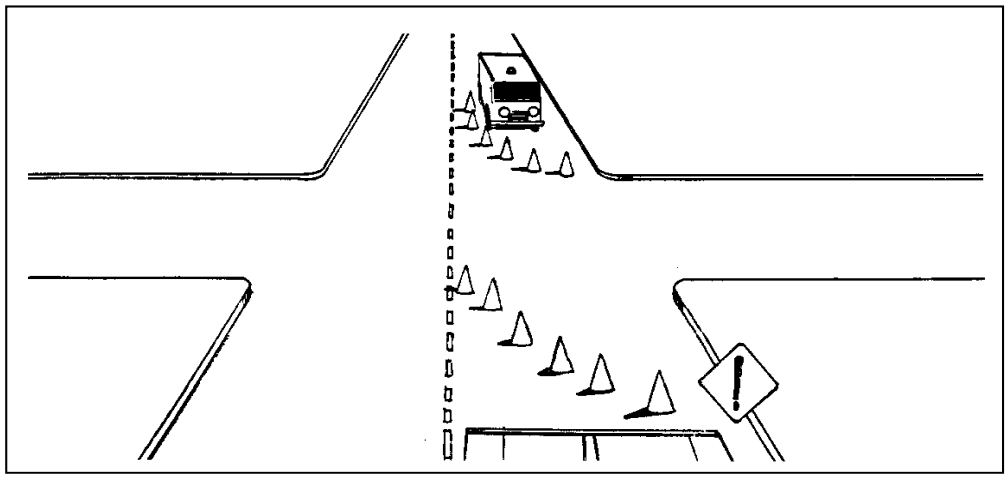
Wrong. This illustration shows how poor planning can increase risks. On both the curve and the side street, placement of the vehicle blocks the drivers' lines of sight. They cannot see oncoming cars until it is too late.



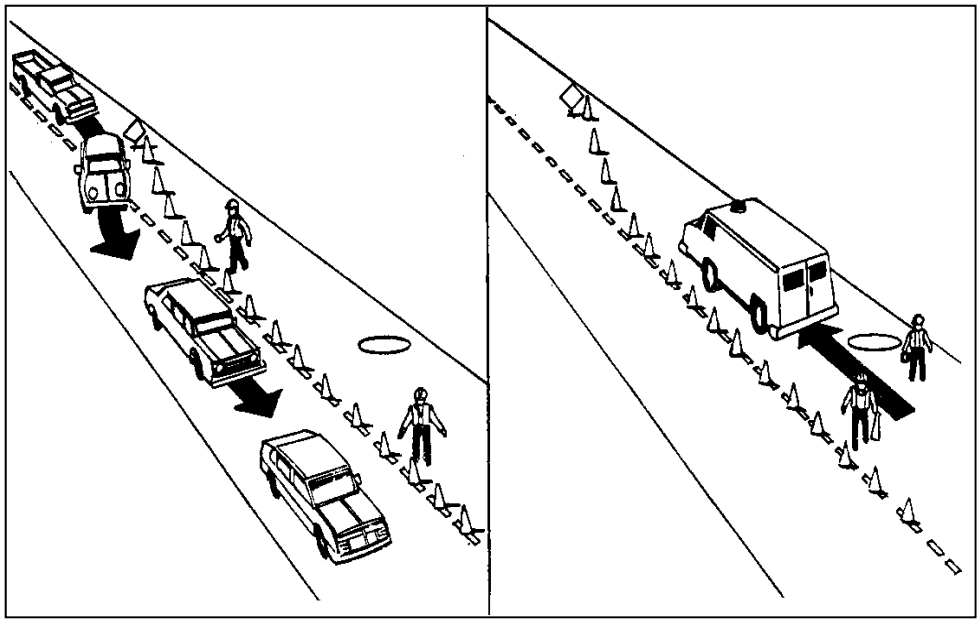
Correct. This illustration shows how cones properly used at an intersection allow both drivers to see the workers and each other and yield appropriately.



Side entrances. When a cone taper blocks a side street or side entrance, make sure cars are still able to move in and out of these areas. Do not just shorten the cone taper. Set two tapers: the first to move traffic out of the lane, the second to warn and control drivers using the side entrance.



Warning before an intersection. When drivers go through an intersection, they tend to focus on the intersection itself, not beyond it. Placing a warning sign across the intersection near oncoming drivers alerts them and lets them take corrective action before it is too late.



Test traffic controls. It can be dangerous to stop a vehicle in traffic and then set out traffic controls. In these situations, park the vehicle by the side of the road, then place the traffic controls. Observe how traffic follows the controls. When it looks safe to do so, drive the vehicle into the space created by the preplaced traffic controls.

CDC Tick Fact Sheet

Ticks and Lyme Disease

For more information about Lyme disease, visit http://www.cdc.gov/Lyme

How to prevent tick bites when working outdoors

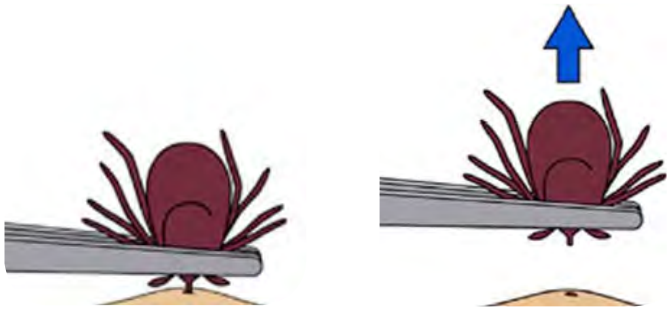
Ticks can spread disease, including Lyme disease. Protect yourself:

- Use insect repellent that contains 20 - 30% DEET.
- Wear clothing that has been treated with permethrin.
- Take a shower as soon as you can after working outdoors.
- Look for ticks on your body. Ticks can hide under the armpits, behind the knees, in the hair, and in the groin.
- Put your clothes in the dryer on high heat for 60 minutes to kill any remaining ticks.

How to remove a tick

1. If a tick is attached to you, use fine-tipped tweezers to grasp the tick at the surface of your skin.
2. Pull the tick straight up and out. Don't twist or jerk the tick—this can cause the mouth parts to break off and stay in the skin. If this happens, remove the mouth parts with tweezers if you can. If not, leave them alone and let your skin heal.
3. Clean the bite and your hands with rubbing alcohol, an iodine scrub, or soap and water.
4. You may get a small bump or redness that goes away in 1-2 days, like a mosquito bite. This is not a sign that you have Lyme disease.

Note: *Do not put hot matches, nail polish, or petroleum jelly on the tick to try to make it pull away from your skin.*



If you remove a tick quickly (within 24 hours) you can greatly reduce your chances of getting Lyme disease.

National Center for Emerging and Zoonotic Infectious Diseases
Division of Vector Borne Diseases | Bacterial Diseases Branch

CS232422-A

Facial paralysis.

Bull's eye rash on the back.

Arthritic knee.

When to see your doctor

See a doctor if you develop a fever, a rash, severe fatigue, facial paralysis, or joint pain within 30 days of being bitten by a tick. Be sure to tell your doctor about your tick bite. If you have these symptoms and work where Lyme disease is common, it is important to get treatment right away.

If you do not get treatment, you may later experience severe arthritis and problems with your nerves, spinal cord, brain, or heart.

Antibiotics are used to treat Lyme disease

Your doctor will prescribe specific antibiotics, typically for 2-3 weeks. Most patients recover during this time. You may feel tired while you are recovering, even though the infection is cured.

If you wait longer to seek treatment or take the wrong medicine, you may have symptoms that are more difficult to treat.

Looking ahead to recovery

Take your antibiotics as recommended. Allow yourself plenty of rest. It may take time to feel better, just as it takes time to recover from other illnesses.

Some people wonder if there is a test to confirm that they are cured. This is not possible. Your body remembers an infection long after it has been cured. Additional blood tests might be positive for months or years. Don't let this alarm you. It doesn't mean you are still infected.

Finally, practice prevention against tick bites. You can get Lyme disease again if you are bitten by another infected tick.

Additional information

1. http://www.cdc.gov/Lyme
2. The Clinical Assessment, Treatment, and Prevention of Lyme Disease, Human Granulocytic Anaplasmosis, and Babesiosis: Clinical Practice Guidelines by the Infectious Diseases Society of America http://cid.oxfordjournals.org/content/43/9/1089.full
3. Tick Management Handbook (Connecticut Agricultural Experiment Station, New Haven) http://www.ct.gov/caes/lib/caes/documents/special_features/tickhandbook.pdf

The bite of a blacklegged tick can transmit the bacteria that cause Lyme disease.

For more information please contact Centers for Disease Control and Prevention
1600 Clifton Road NE, Atlanta, GA 30333
Telephone: 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-63548
Email: cdcinfo@cdc.gov Web: www.cdc.gov

ATTACHMENT C

PCB INFORMATION TABLE AND SAFETY DATA SHEETS

Anniston PCB Site
Anniston, Alabama
Health and Safety Plan

CHEMICAL HAZARD INFORMATION

Substance [CAS Number]	IP[1] (eV)	Odor Threshold (ppm)	Route[2]	Symptoms of Exposure	Treatment	TWA[3]	STEL[4]	Source[5]	IDLH (NIOSH)
Polychlorinated biphenyls (PCB) [1336-36-3] Aroclor 1242 [53469-21-9] and Aroclor 1254 [11097-69-1]	NA	ND	Inh Abs Ing Con	Aroclor 1242: irritated eyes; chloracne; acne-form dermatitis; liver damage; reproductive effects; mildly toxic by ingestion; poison by subcutaneous route – carcinogenic Aroclor 1254: irritated eyes; chloracne, acne-form dermatitis; liver damage; reproductive effects; poison by intravenous route; moderately toxic by ingestion and intraperitoneal routes – carcinogenic	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	Aroclor 1242: 1 mg/m^3 (skin) 1 mg/m^3 (skin) 0.001 mg/m^3 Aroclor 1254: 0.5 mg/m^3 (skin) 0.5 mg/m^3 (skin) 0.001 mg/m^3		PEL TLV REL PEL TLV REL	Ca (5 mg/m^3)

NOTES:

[1]IP = Ionization potential (electron volts).
[2]Route = Inh, Inhalation; Abs, Skin absorption; Ing, Ingestion; and Con, Skin and/or eye contact.
[3]TWA = Time-weighted average. The TWA concentration for a normal workday (usually 8 or 10 hours) and a 40-hour work week, to which nearly all workers may be repeatedly exposed, day after day without adverse effect.
[4]STEL = Short-term exposure limit. A 15-minute TWA exposure that should not be exceeded at any time during a workday, even if the TWA is not exceeded.
[5]PEL = Occupational Safety and Health Administration (OSHA) permissible exposure limit (29 CFR 1910.1000, Table Z).
[5]TLV = American Conference of Governmental Industrial Hygiene (ACGIH) threshold limit value – TWA.
[5]REL = National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit.
[6]IDLH = Immediately dangerous to life or health (NIOSH). Represents the maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing or irreversible health effects.

NE = None established. No evidence could be found for the existence of an IDLH (NIOSH Pocket Guide to Chemical Hazards, Pub. No. 90-117, 1990, 1997).
C = Ceiling limit value which should not be exceeded at any time.
Ca = Carcinogen.
NA = Not applicable.
ND = Not Determined.
LEL = Lower explosive limits.
LC_{50} = Lethal concentration for 50 percent of population tested.
LD_{50} = Lethal dose for 50 percent of population tested.
NIC = Notice of intended change (ACGIH).

CHEMICAL HAZARD INFORMATION

References:

American Conference of Governmental Industrial Hygienists (ACGIH) Guide to Occupational Exposure Values, 2003, compiled by the ACGIH.

ACGIH Threshold Limit Values, 2003, compiled by the ACGIH

Amoore, J. and E. Hautula, "Odor as an Aid to Chemical Safety," Journal of Applied Toxicology, 1983.

Clayton, George D. and F.E. Clayton, Patty's Industrial Hygiene and Toxicology, 3rd ed., John Wiley & Sons, New York.

Documentation of TLVs and BEIs, American Conference of Governmental Industrial Hygienists, 5th ed., 1986.

Fazzuluri, F.A., Compilation of Odor and Taste Threshold Values Data, American Society for Testing and Materials, 1978.

Gemet, L. and J. Van, Compilation of Odor Threshold Values in Air and Water, CIVO, Netherlands, 1977.

Gemet, L. and J. Van, Compilation of Odor Threshold Values in Air and Water, Supplement IV, CIVO, Netherlands, 1977.

Lewis, Richard J., Sr., 1992, Sax's Dangerous Properties of Industrial Materials, 8th ed., Van Nostrand Reinhold, New York.

Micromedex Tomes Plus (R) System, 1992, Micromedex, Inc.

National Institute for Occupational Safety and health Pocket Guide to Chemicals, Pub. 1990, No. 97-140, National Institute for Occupational Safety and Health, 2003.

Odor Threshold for Chemicals with Established Occupational Health Standards, American industrial Hygiene Association, 1989.

Respirator Selection Guide, 3M Occupational Health and Safety Division, 1993.

Verschuseren, K., Handbook of Environmental Data on Organic Chemicals, Van Nostrand and Reinhold, 1977.

Warning Properties of Industrial Chemicals – Occupational Health Resource Center, Oregon Lung Association.

Workplace Environmental Exposure Levels, American Industrial Hygiene Association, 1992.

SAFETY DATA SHEET

Version 5.9
Revision Date 06/02/2016
Print Date 07/04/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : PCBs in Soil

Product Number : SQC010
Brand : Sigma-Aldrich

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word none

Hazard statement(s)
H411 Toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P273 Avoid release to the environment.
P391 Collect spillage.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

No components need to be disclosed according to the applicable regulations.
For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Store at Room Temperature.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available

k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Nerves. - (Aroclor 1260)
Stomach - Irregularities - Based on Human Evidence (Aroclor 1254)
Stomach - Irregularities - Based on Human Evidence (PCB - Aroclor 1221)
Stomach - Irregularities - Based on Human Evidence (Aroclor 1248)
Stomach - Irregularities - Based on Human Evidence (PCB- Aroclor 1268)

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Aroclor 1016, Aroclor 1254)
Marine pollutant:yes

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Aroclor 1016, Aroclor 1254)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
No SARA Hazards

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Aroclor 1254	11097-69-1	1993-04-24
Aroclor 1242	53469-21-9	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Soil	-	

New Jersey Right To Know Components

	CAS-No.	Revision Date
Soil	-	

California Prop. 65 Components

WARNING! This product contains a chemical known to the	CAS-No.	Revision Date
State of California to cause cancer.	11096-82-5	2008-08-01
Aroclor 1260		
Aroclor 1254	11097-69-1	1990-06-30
PCB - Aroclor 1221	11104-28-2	2008-08-01
Aroclor 1232	11141-16-5	2008-08-01
Aroclor 1248	12672-29-6	2008-08-01
Aroclor 1016	12674-11-2	2008-08-01
PCB - Aroclor 1262	37324-23-5	2008-08-01
PCB- Aroclor 1268	11100-14-4	2008-08-01
Aroclor 1242	53469-21-9	2008-08-01

WARNING: This product contains a chemical known to the	CAS-No.	Revision Date
State of California to cause birth defects or other reproductive harm.	11096-82-5	2008-08-01
Aroclor 1260		
Aroclor 1254	11097-69-1	1990-06-30
PCB - Aroclor 1221	11104-28-2	2008-08-01

Aroclor 1232	11141-16-5	2008-08-01
Aroclor 1248	12672-29-6	2008-08-01
Aroclor 1016	12674-11-2	2008-08-01
PCB - Aroclor 1262	37324-23-5	2008-08-01
PCB- Aroclor 1268	11100-14-4	2008-08-01
Aroclor 1242	53469-21-9	2008-08-01

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H401	Toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	0
Reactivity Hazard:	0

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.9 Revision Date: 06/02/2016 Print Date: 07/04/2016

Safety Data Sheet
acc. to OSHA HCS

Printing date 01/20/2016 *Reviewed on 01/20/2016*

1 Identification

· **Product identifier**

· **Product Name: Ethyl parathion**

· **Part Number:** S-1935
· **Application of the substance / the mixture** Certified Reference Material

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
SPEX CertiPrep, LLC.
203 Norcross Ave, Metuchen,
NJ 08840 USA

· **Information department:** product safety department
· **Emergency telephone number:**
Emergency Phone Number (24 hours)
CHEMTREC (800-424-9300)
Outside US: 703-527-3887

2 Hazard(s) identification

· **Classification of the substance or mixture**

GHS02 Flame

Flam. Liq. 2 H225 Highly flammable liquid and vapor.

GHS06 Skull and crossbones

Acute Tox. 3 H331 Toxic if inhaled.

GHS08 Health hazard

STOT SE 1 H370 Causes damage to organs.

GHS07

Acute Tox. 4 H302 Harmful if swallowed.

· **Label elements**
· **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).
· **Hazard pictograms**

GHS02 GHS06 GHS08

· **Signal word** Danger

· **Hazard-determining components of labeling:**
methanol
parathion (ISO)
· **Hazard statements**
Highly flammable liquid and vapor.
Harmful if swallowed.
Toxic if inhaled.
Causes damage to organs.
· **Precautionary statements**
Keep away from heat/sparks/open flames/hot surfaces. No smoking.
Use explosion-proof electrical/ventilating/lighting/equipment.
Do not breathe dust/fume/gas/mist/vapors/spray.
If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
Store locked up.
Dispose of contents/container in accordance with local/regional/national/international regulations.

(Contd. on page 2)

Safety Data Sheet
acc. to OSHA HCS

Printing date 01/20/2016 Reviewed on 01/20/2016

Product Name: Ethyl parathion

(Contd. of page 1)

· **Classification system:**
· **NFPA ratings (scale 0 - 4)**

Health = 1
Fire = 3
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = *1
Fire = 3
Reactivity = 0

· **Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

3 Composition/information on ingredients

· **Chemical characterization: Mixtures**
· **Description:** Mixture of the substances listed below with nonhazardous additions.

· **Dangerous components:**		
67-56-1	methanol	99.9%

· **Chemical identification of the substance/preparation**		
56-38-2	parathion (ISO)	0.1%

4 First-aid measures

· **Description of first aid measures**
· **General information:**
Immediately remove any clothing soiled by the product.
Remove breathing apparatus only after contaminated clothing have been completely removed.
In case of irregular breathing or respiratory arrest provide artificial respiration.
· **After inhalation:**
Supply fresh air or oxygen; call for doctor.
In case of unconsciousness place patient stably in side position for transportation.
· **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
· **After eye contact:** Rinse opened eye for several minutes under running water. Then consult a doctor.
· **After swallowing:** Do not induce vomiting; immediately call for medical help.
· **Information for Doctor:**
· **Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **Indication of any immediate medical attention and special treatment needed** No further relevant information available.

5 Fire-fighting measures

· **Extinguishing media**
· **Suitable extinguishing agents:** CO2, sand, extinguishing powder. Do not use water.
· **For safety reasons unsuitable extinguishing agents:** Water with full jet
· **Special hazards arising from the substance or mixture** No further relevant information available.
· **Advice for firefighters**
· **Protective equipment:** Mouth respiratory protective device.

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures** Wear protective equipment. Keep unprotected persons away.
· **Environmental precautions:**
Do not allow product to reach sewage system or any water course.
Inform respective authorities in case of seepage into water course or sewage system.
Do not allow to enter sewers/ surface or ground water.
· **Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Dispose contaminated material as waste according to item 13.

(Contd. on page 3)

Safety Data Sheet
acc. to OSHA HCS

Product Name: Ethyl parathion

(Contd. of page 2)

Ensure adequate ventilation.
Do not flush with water or aqueous cleansing agents
· **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

· **Handling:**
· **Precautions for safe handling**
Ensure good ventilation/exhaustion at the workplace.
Open and handle receptacle with care.
Prevent formation of aerosols.
· **Information about protection against explosions and fires:**
Keep ignition sources away - Do not smoke.
Protect against electrostatic charges.
Keep respiratory protective device available.

· **Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** Store in a cool location.
· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:**
Keep receptacle tightly sealed.
Store in cool, dry conditions in well sealed receptacles.
· **Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

· **Additional information about design of technical systems:** No further data; see item 7.

· **Control parameters**

· **Components with limit values that require monitoring at the workplace:**	
67-56-1 methanol	
PEL	Long-term value: 260 mg/m³, 200 ppm
REL	Short-term value: 325 mg/m³, 250 ppm Long-term value: 260 mg/m³, 200 ppm Skin
TLV	Short-term value: 328 mg/m³, 250 ppm Long-term value: 262 mg/m³, 200 ppm Skin; BEI

· **Ingredients with biological limit values:**	
67-56-1 methanol	
BEI	15 mg/L Medium: urine Time: end of shift Parameter: Methanol (background, nonspecific)

· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Store protective clothing separately.
Avoid contact with the eyes and skin.
· **Breathing equipment:**
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.
· **Protection of hands:**

Protective gloves

(Contd. on page 4)

Safety Data Sheet
acc. to OSHA HCS

Product Name: Ethyl parathion

(Contd. of page 3)

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

· **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

· **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

· **Eye protection:**

Tightly sealed goggles

9 Physical and chemical properties

· **Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Liquid
Color:	According to product specification
· **Odor:**	Characteristic
· **Odour Threshold:**	Not applicable.
· **pH-value:**	Not applicable.
· **Change in condition**	
Melting point/Melting range:	Undetermined.
Boiling point/Boiling range:	64 °C (147 °F)
· **Flash point:**	11 °C (52 °F)
· **Flammability (solid, gaseous):**	Not applicable.
· **Ignition temperature:**	455 °C (851 °F)
· **Decomposition temperature:**	Not applicable.
· **Auto igniting:**	Product is not selfigniting.
· **Danger of explosion:**	Product is not explosive. However, formation of explosive air/vapor mixtures are possible.
· **Explosion limits:**	
Lower:	5.5 Vol %
Upper:	44.0 Vol %
· **Vapor pressure at 20 °C (68 °F):**	128 hPa (96 mm Hg)
· **Density at 20 °C (68 °F)**	0.79048 g/cm³ (6.597 lbs/gal)
· **Relative density**	Not applicable.
· **Vapor density**	Not applicable.
· **Evaporation rate**	Not applicable.
· **Solubility in / Miscibility with**	
Water:	Not miscible or difficult to mix.
· **Partition coefficient (n-octanol/water):**	Not applicable.
· **Viscosity:**	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
· **Solvent content:**	
Organic solvents:	100.0 %
VOC content:	100.0 %
· **Other information**	No further relevant information available.

10 Stability and reactivity

· **Reactivity** No further relevant information available.
· **Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.

(Contd. on page 5)

Safety Data Sheet
acc. to OSHA HCS

Product Name: Ethyl parathion

(Contd. of page 4)

· **Possibility of hazardous reactions** No dangerous reactions known.
· **Conditions to avoid** No further relevant information available.
· **Incompatible materials:** No further relevant information available.
· **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

· **Information on toxicological effects**
· **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**		
67-56-1 methanol		
Oral	LD50	5628 mg/kg (rat)
Dermal	LD50	15800 mg/kg (rabbit)
56-38-2 parathion (ISO)		
Oral	LD50	2 mg/kg (rat)
Dermal	LD50	6.8 mg/kg (rat)

· **Primary irritant effect:**
· **on the skin:** No irritant effect.
· **on the eye:** No irritating effect.
· **Sensitization:** No sensitizing effects known.
· **Additional toxicological information:**
The product shows the following dangers according to internally approved calculation methods for preparations:
Toxic

· **Carcinogenic categories**

· **IARC (International Agency for Research on Cancer)**		
56-38-2	parathion (ISO)	3

· **NTP (National Toxicology Program)**
None of the ingredients is listed.

· **OSHA-Ca (Occupational Safety & Health Administration)**
None of the ingredients is listed.

12 Ecological information

· **Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **Persistence and degradability** No further relevant information available.
· **Behavior in environmental systems:**
· **Bioaccumulative potential** No further relevant information available.
· **Mobility in soil** No further relevant information available.
· **Ecotoxical effects:**
· **Remark:** Toxic for fish
· **Additional ecological information:**
· **General notes:**
Water hazard class 1 (Self-assessment): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Also poisonous for fish and plankton in water bodies.
Toxic for aquatic organisms
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **Other adverse effects** No further relevant information available.

13 Disposal considerations

· **Waste treatment methods**
· **Recommendation:** Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

· **Uncleaned packagings:**
· **Recommendation:** Disposal must be made according to official regulations.

(Contd. on page 6)

Safety Data Sheet
acc. to OSHA HCS

Product Name: Ethyl parathion

(Contd. of page 5)

14 Transport information

· **UN-Number**
· **DOT, ADR, IMDG, IATA** UN1230

· **UN proper shipping name**
· **DOT, IATA** Methanol
· **ADR** 1230 Methanol, ENVIRONMENTALLY HAZARDOUS
· **IMDG** METHANOL, MARINE POLLUTANT

· **Transport hazard class(es)**

· **DOT**

· **Class** 3 Flammable liquids
· **Label** 3, 6.1

· **ADR**

· **Class** 3 Flammable liquids
· **Label** 3+6.1

· **IMDG**

· **Class** 3 Flammable liquids
· **Label** 3/6.1

· **IATA**

· **Class** 3 Flammable liquids
· **Label** 3 (6.1)

· **Packing group**
· **DOT, ADR, IMDG, IATA** II

· **Environmental hazards:** Product contains environmentally hazardous substances: parathion (ISO)
· **Marine pollutant:** Symbol (fish and tree)
· **Special marking (ADR):** Symbol (fish and tree)

· **Special precautions for user** Warning: Flammable liquids
· **Danger code (Kemler):** 336
· **EMS Number:** F-E,S-D
· **Stowage Category** B
· **Stowage Code** SW2 Clear of living quarters.

· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code** Not applicable.

· **Transport/Additional information:**

· **ADR**
· **Excepted quantities (EQ)** Code: E2
Maximum net quantity per inner packaging: 30 ml
Maximum net quantity per outer packaging: 500 ml

· **IMDG**
· **Limited quantities (LQ)** 1L

(Contd. on page 7)

Safety Data Sheet
acc. to OSHA HCS

Product Name: Ethyl parathion

(Contd. of page 6)

· **Excepted quantities (EQ)**	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· **UN "Model Regulation":**	UN 1230 METHANOL, 3 (6.1), II, ENVIRONMENTALLY HAZARDOUS

15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **Sara**

· **Section 355 (extremely hazardous substances):**

56-38-2	parathion (ISO)

· **Section 313 (Specific toxic chemical listings):**
All ingredients are listed.

· **TSCA (Toxic Substances Control Act):**

67-56-1	methanol

· **Proposition 65**

· **Chemicals known to cause cancer:**
None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for females:**
None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for males:**
None of the ingredients is listed.

· **Chemicals known to cause developmental toxicity:**

67-56-1	methanol

· **Carcinogenic categories**

· **EPA (Environmental Protection Agency)**

56-38-2	parathion (ISO)	C

· **TLV (Threshold Limit Value established by ACGIH)**

56-38-2	parathion (ISO)	A4

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**
None of the ingredients is listed.

· **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).
· **Hazard pictograms**

GHS02 GHS06 GHS08

· **Signal word** Danger

· **Hazard-determining components of labeling:**
methanol
parathion (ISO)
· **Hazard statements**
Highly flammable liquid and vapor.
Harmful if swallowed.
Toxic if inhaled.
Causes damage to organs.
· **Precautionary statements**
Keep away from heat/sparks/open flames/hot surfaces. No smoking.
Use explosion-proof electrical/ventilating/lighting/equipment.
Do not breathe dust/fume/gas/mist/vapors/spray.
If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
Store locked up.
Dispose of contents/container in accordance with local/regional/national/international regulations.
· **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

(Contd. on page 8)

Safety Data Sheet
acc. to OSHA HCS

Product Name: Ethyl parathion

(Contd. of page 7)

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Department issuing SDS:** product safety department
· **Contact:**
SPEX CertiPrep, LLC.
1-732-549-7144
· **Date of preparation / last revision** 01/20/2016 / -
· **Abbreviations and acronyms:**
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
VOC: Volatile Organic Compounds (USA, EU)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
BEI: Biological Exposure Limit
Flam. Liq. 2: Flammable liquids, Hazard Category 2
Acute Tox. 4: Acute toxicity, Hazard Category 4
Acute Tox. 3: Acute toxicity, Hazard Category 3
STOT SE 1: Specific target organ toxicity - Single exposure, Hazard Category 1

SAFETY DATA SHEET

Version 4.8
Revision Date 05/23/2016
Print Date 02/13/2018

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 4-Nitrophenol

Product Number : 48549
Brand : Supelco
Index-No. : 609-015-00-2

CAS-No. : 100-02-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 4), H332
Acute toxicity, Dermal (Category 4), H312
Specific target organ toxicity - repeated exposure (Category 2), H373
Acute aquatic toxicity (Category 2), H401

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H301 Toxic if swallowed.
H312 + H332 Harmful in contact with skin or if inhaled
H373 May cause damage to organs through prolonged or repeated exposure.
H401 Toxic to aquatic life.

Precautionary statement(s)
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.

P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse mouth.
P302 + P352 + P312	IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/ physician if you feel unwell.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
P314	Get medical advice/ attention if you feel unwell.
P363	Wash contaminated clothing before reuse.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	*p*-Nitrophenol
Formula	:	$C_6H_5NO_3C_6H_5NO_3$
Molecular weight	:	139.11 g/mol
CAS-No.	:	100-02-7
EC-No.	:	202-811-7
Index-No.	:	609-015-00-2

Hazardous components

Component	Classification	Concentration
p-Nitrophenol		
	Acute Tox. 3; Acute Tox. 4; STOT RE 2; Aquatic Acute 2; H301, H312 + H332, H373, H401	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: light yellow
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	4.4 at 5.00000 g/l at 24.0 °C (75.2 °F)
e)	Melting point/freezing point	Melting point/range: 110 - 115 °C (230 - 239 °F) - lit.
f)	Initial boiling point and boiling range	279 °C (534 °F) - lit.
g)	Flash point	169.0 °C (336.2 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	9.2 hPa (6.9 mmHg) at 165.0 °C (329.0 °F) 0.8 hPa (0.6 mmHg) at 120.0 °C (248.0 °F)
l)	Vapour density	No data available

m)	Relative density	1.48 g/cm3 at 20.00 °C (68.00 °F)
n)	Water solubility	15 g/l
o)	Partition coefficient: n-octanol/water	log Pow: 1.91
p)	Auto-ignition temperature	283.0 °C (541.4 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Bulk density	550 kg/m3 760 kg/m3

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents, Strong bases

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Nitrogen oxides (NOx)
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 202.0 mg/kg
Remarks: Behavioral:Somnolence (general depressed activity). Behavioral:Convulsions or effect on seizure threshold. Lungs, Thorax, or Respiration:Dyspnea.

LD50 Dermal - Rat - 1,024 mg/kg

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 2.

Aspiration hazard
No data available

Additional Information
RTECS: SM2275000

Absorption into the body leads to the formation of methemoglobin which in sufficient concentration causes cyanosis. Onset may be delayed 2 to 4 hours or longer., Depending on the intensity and duration of exposure, effects may vary from mild irritation to severe destruction of tissue., Damage to the eyes.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Eyes -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Cyprinodon variegatus (sheepshead minnow) - 26.70 - 31.30 mg/l - 96 h
	LC50 - Oncorhynchus mykiss (rainbow trout) - 3.80 - 18.00 mg/l - 96 h
	LC50 - Pimephales promelas (fathead minnow) - 30.40 - 67.00 mg/l - 96 h
	NOEC - Oncorhynchus mykiss (rainbow trout) - 5.31 mg/l - 14 d
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 3.10 - 24.00 mg/l - 48 h
Toxicity to algae	EC50 - No information available. - 11.00 mg/l - 48 h

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 90 % - Readily biodegradable

12.3 Bioaccumulative potential

Bioaccumulation	Pimephales promelas (fathead minnow) - 28 d - 0.0441 mg/l
	Bioconcentration factor (BCF): 280

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life.

Do not empty into drains.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1663 Class: 6.1 Packing group: III
Proper shipping name: Nitrophenols
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1663 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: NITROPHENOLS (o-, m-, p-)

IATA

UN number: 1663 Class: 6.1 Packing group: III
Proper shipping name: Nitrophenols

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
p-Nitrophenol	100-02-7	2007-07-01

SARA 311/312 Hazards

Acute Health Hazard

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
H301	Toxic if swallowed.
H312	Harmful in contact with skin.
H312 + H332	Harmful in contact with skin or if inhaled
H332	Harmful if inhaled.
H373	May cause damage to organs through prolonged or repeated exposure.

H401 Toxic to aquatic life.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	
Flammability:	1
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	1
Reactivity Hazard:	0

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.8 Revision Date: 05/23/2016 Print Date: 02/13/2018

APPENDIX B
Emergency Response Plan

EMERGENCY RESPONSE PLAN

Operable Unit 1/Operable Unit 2 Portion of the Anniston PCB Site

Pharmacia LLC/Solutia Inc.

August 2021

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

CFR	Code of Federal Regulations
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EPCRA	Emergency Planning and Community Right-to-Know Act
ERP	emergency response plan
Geosyntec	Geosyntec Consultants, Inc.
HASP	health and safety plan
HAZWOPER	Hazardous Waste Operations Emergency and Response
JSA	job safety analysis
OSHA	Occupational Safety and Health Administration
OU	operable unit
PCB	polychlorinated biphenyl
PPE	personal protective equipment
P/S	Pharmacia LLC/Solutia Inc.
RA	remedial action
RD	remedial design
RDWP	remedial design work plan
ROD	Record of Decision
RPM	Remedial Project Manager
SHSO	Site Health Safety Officer
SPCC	spill prevention control and countermeasures plan
SSO	Site Safety Officer
U.S.C	United States Code
USEPA	United States Environmental Protection Agency

1. INTRODUCTION

This emergency response plan (ERP) has been developed for the Operable Unit 1/Operable Unit 2 (OU-1/OU-2) portion of the Anniston polychlorinated biphenyl (PCB) Site (the Site) as an Attachment B to the OU-1/OU-2 Remedial Design Work Plan (OU-1/OU-2 RDWP; Geosyntec 2021a). The ERP describes procedures to prepare for and respond to an emergency situation should it occur while conducting activities under the OU-1/OU-2 Remedial Design/Remedial Action (RD/RA) Consent Decree (CD: United States Environmental Protection Agency [USEPA] 2021) on behalf of Pharmacia LLC/Solutia Inc. (P/S). The CD presents the work that P/S are conducting for portions of the remedies identified in the OU-1/OU-2 Record of Decision (ROD; USEPA 2017).

This ERP complies with requirements set forth in the CD, and Table 1-1 presents a list of requirements from the CD along with a brief description and the corresponding location in this ERP where each requirement is addressed. The ERP provides an overall framework for the task-specific emergency procedures that will be presented in individual job safety analysis (JSA) evaluations required under the OU-1/OU-2 RD/RA health and safety plan (OU-1/OU-2 RD/RA HASP; Geosyntec 2021b). The task-specific hazards, working conditions, and response actions will be described in the individual JSAs. The ERP will also be amended if changes to the approach to prepare for or follow-up from an emergency event are identified over time.

2. SITE DESCRIPTION

The Site includes residential, commercial/industrial, and public properties located in and around Anniston, Oxford, Hobson City, and areas of Calhoun and Talladega Counties in Alabama (Figure 2-1). The Site has been investigated for over 20 years, including for the potential presence of PCBs and other chemical constituents in various environmental media. The Site is currently divided into multiple OUs (Figure 2-1) and OU-1/OU-2 is a combination of what was originally two OUs representing residential properties (OU-1) and nonresidential properties (OU-2) around the facility currently owned by Solutia Inc., a wholly owned subsidiary of Eastman Chemical Company, and downstream along Snow Creek to Highway 78. OU-3 is Solutia's Anniston Facility (the Facility) and its adjacent closed landfills: the South Landfill and the West End Landfill. OU-4 includes Choccolocco Creek and its 100-year floodplain from the confluence with Snow Creek downstream to the embayment of Lake Logan Martin and the portion of Snow Creek and its 100-year floodplain located downstream of Highway 78. The Site is not on the Superfund National Priorities List; it is being addressed through the Superfund Alternative Approach. The Superfund site identification number is ALD000400123.

3. EMERGENCY RESPONSE ROLES AND RESPONSIBILITIES

This section presents the roles and responsibilities for personnel that may be involved with preparing for, responding to, and following-up to emergency situations that could occur during the OU-1/OU-2 RD/RA project. Names, titles, and telephone numbers for key personnel and local first responders are provided in Table 3-1. Additional contact information for personnel directly responsible for RD/RA work, including emergency response resources (e.g., emergency response contractors), will be provided in the individual JSAs.

3.1 Anniston PCB Site Manager

The Anniston PCB Site Manager (P/S representative) has overall responsibility for projects associated with the Site and has final authority for decisions made by the working at the Site. The Anniston PCB Site Manager also communicates directly with the Remedial Project Manager (RPM) from USEPA for all RD/RA work conducted under the CD.

3.2 Project Manager

A Project Manager (or Task Manager) will be identified for each work activity. The Project Managers are responsible for providing resources to complete project activities in accordance with this ERP and for meeting all regulatory requirements in the event of an incident. The Project Managers are also responsible for confirming that the Site Safety Officer (SSO) has the equipment, materials, and qualified personnel to fully implement the safety requirements of the OU-1/OU-2 RD/RA HASP should an incident occur.

3.3 Corporate Safety Manager

Each contractor and subcontractor conducting work for the OU-1/OU-2 RD/RA project will have a Corporate Safety Manager, responsible for implementing that company's health and safety programs and adhering to Site health and safety requirements. The Corporate Safety Manager is a resource that the project team can access regarding incidence response and reporting and the safe conduct of work (e.g., training, medical monitoring, respiratory protection) based on Occupational Safety and Health Administration (OSHA) requirements. The name and contact information for the Corporate Safety Manager will be provided in the task-specific JSA.

3.4 Site Safety Officer

The SSO (or designee) is responsible for field health and safety issues and questions in the field regarding health and safety procedures, project procedures, and other technical or regulatory issues. The SSO will be on-site while RD/RA work is being conducted and may be the initial safety professional to assess the nature and severity of an incident should it occur. The SSO will also be responsible for reviewing the task-specific JSAs to provide the appropriate personnel, personal protective equipment (PPE), air monitoring equipment, permits (e.g., lockout-tagout, confined space, hot work), and emergency spill response resources identified to support the planned work. The name and contact information for the SSO will be provided in the task-specific JSA.

3.5 USEPA Project Coordinator

The Project Coordinator is responsible for managing the Site on from the perspective of USEPA and may be supported by other USEPA personnel such as an on-scene coordinator and/or Emergency Response Unit in the event of an emergency spill or release. The name and contact information for the Project Coordinator will be provided in the task-specific JSA.

3.6 Emergency Spill Response Contractor

A list of appropriately trained and equipped emergency spill response contractors will be included in the task-specific JSAs. These contractors will be contacted and provided with the location and a description of the RD/RA work should their services be needed. At least two emergency spill response contractors will be included on the list to provide redundancy in resources should an emergency spill or release occur.

3.7 Local First Responders

Table 3-1 includes a list of first responders including the local fire and police departments. These organizations would be contacted through the 911 reporting system as part of the incident reporting process and would be significantly involved in the response effort. When indicated by the task-specific JSA, these first responders would be contacted to familiarize them with the locations and nature of the RD/RA work. Updates would also be provided to the first responders as the locations and type of work changed throughout the RD/RA project.

4. EMERGENCY RESPONSE PLAN PROCEDURES

This section presents measures to prepare for an emergency and the procedures to follow in the event of an emergency, including post-emergency follow-up activities. Task-specific emergency procedures will be presented in the JSA evaluations that will be developed for RD/RA work conducted under the CD. The process to develop task-specific JSAs is described in Section 3.2 of the OU-1/OU-2 RD/RA HASP (Geosyntec 2021b).

4.1 Incident Notification and Reporting

This ERP is focused on **serious emergencies that require emergency response from external emergency providers**—whether serious injury, fire, security incident, utility-related event, or other serious emergency—the following procedures shall be implemented and may be augmented by information provided in the individual JSAs:

1. Notify the SSO immediately.
2. Call 911:
    a. If you reach a recording, do not hang up; wait for the call-taker to respond
    b. Provide an accurate description of the event
    c. Stay calm, listen carefully, follow all instructions
    d. Answer all questions accurately and clearly
3. Conduct evacuation procedures as appropriate for the situation.
4. Provide accurate meeting location (Rally Point). This location will depend on the location of the emergency at the Site.
5. After incident is stabilized and emergency response procedures are complete, notify appropriate project personnel.
6. Implement any further actions necessary, per directions and recommendations of the Project Manager personnel and/or health and safety personnel.
7. Within 12 hours after the incident, a draft of the Incident Near-Miss Investigation Report (Attachment A.5 of the OU-1/OU-2 RD/RA HASP) shall be completed by the SSO.
8. Project Manager to submit final version of Incident Report to the P/S representative within 24 hours.

4.2 Site Evacuation

If applicable, the SSO shall call for evacuation of the work area. If evacuation from the work area is required, Site workers should move to the meeting location (Rally Point) that will be determined based on the work area, unless unique evacuation procedures are presented in the task-specific JSA. An evacuation of the work area may be required as a result of the ongoing remediation of the work area. Three loud blasts on the emergency air horn will indicate that the work area needs to be evacuated. If evacuation is required from the work area, workers should refer to the JSA for

task-specific evacuation procedures. Emergency egress points at the work area will be discussed daily at the tailgate meetings as the location of activities will change.

4.3 Medical Emergencies and First Aid

A first aid kit and portable eyewash equipment will be available anywhere where work is being performed so that personnel can easily and quickly administer first aid. The location of the first aid kit and portable eyewash equipment will be indicated during the preliminary health and safety orientation conducted at the start of a given task and reviewed daily during the tailgate meeting. All first aid kits will be replenished of supplies after use as soon as possible and no later than 24 hours after use. The date of first aid kit replenishment will be noted on the first aid kit inspection tag. Portable eyewash equipment will be visually inspected weekly in accordance with manufacturer's instructions to determine if flushing fluid needs to be changed or supplemented. The inspection will be noted on the eyewash station inspection tag. The following measures shall be followed if material gets into the eyes of workers:

- Flush eyes with water for at least 15 minutes if chemicals do get into the eyes. If irritation persists, seek medical attention.
- Do not rub eyes if dust or foreign objects are in your eyes.
- Do not attempt to remove any object that becomes embedded in the eye. If possible, lightly bandage your eye or both eyes and immediately seek medical attention.

Hospitals facilities near the Site have been identified: St. Vincent's and the Northeast Alabama Regional Medical Center (Figure 4-1). Two facilities are identified to provide options depending on the location of Site activities. Figure 4-1 presents the route to the hospital for emergency-room care for both facilities, including the facility name, phone number, and written directions from the east, west, and south.

In the event of a medical emergency requiring urgent emergency medical care, an ambulance service shall be used to transport the injured party to the hospital. In the event of noncritical, nonemergency injury requiring medical evaluation or treatment, a local Urgent Care facility should be used.

4.4 Person Overboard (from Work Boat)

In the event of a person-overboard situation, the following procedures will be followed:

- All boat personnel will be immediately made aware of the situation.
- One lookout will be assigned to constantly monitor and report the location of the overboard person.
- A ring buoy will be deployed to the overboard person. Movement of the boat at this time should be limited to as little as necessary. A ring buoy should be deployed regardless of whether the overboard person is conscious or unconscious because the device will serve to mark the location of the person overboard.

- If the person is able to swim or be pulled to the boat without moving the boat then the boat should remain as stationary as possible.
- Moving the boat to the overboard person should be done cautiously. The operator of the boat and the lookout should be in constant communication.
- A ladder should be deployed so the person can board the boat. The person should be allowed to enter the boat unassisted, if possible.
- If the person is unconscious, pull him or her onboard using the shoulders of the life jacket or hold or secure the person to the side of the boat while the boat moves slowly to shallow water.
- Precautions should immediately be taken to avoid hypothermia. Dry clothes and blankets should be supplied to the person.
- The boat should move immediately to the nearest docking location and support personnel should be notified of the incident.
- All person-overboard situations must be reported to the SSO.

4.5 Fire and Explosion

For small fires, flames should be extinguished using a fire extinguisher by trained personnel. In the event of large fires or explosion, the local fire department should be contacted, so they can handle mitigation and control. Fire extinguishers will be available anywhere work is being performed and a risk of fire exists. A fire extinguisher must be available at all times on motor-driven marine vessels, work vehicles, and at work areas. The type of fire extinguisher provided must be adequate for the category of fire that is at risk to occur. The location of the fire extinguisher will be indicated during the preliminary health and safety orientation conducted at the start of a given task and reviewed daily during the tailgate meeting.

In the event that warning signs of brushfire are noticed by any field team member (fire sighting, smoke sight or smell, warning from shore support, etc.), all deployed field teams will evacuate the work area immediately, and all work will be suspended. After evacuation, the priority for the SSO is to confirm the evacuation of all field personnel, and then notify appropriate emergency services and project personnel. All field activities will be suspended until it can be confirmed that the fire has been completely controlled and extinguished.

Fire extinguishers must be inspected monthly in accordance with Section 10.1.6 of the OU-1/OU-2 RD/RA HASP. An inspection record must be maintained by the SSO. The inspection must verify the following:

- Hose, horn, and nozzle are unobstructed.
- Gauge pressure is in the operable range.
- Lock pin and tamper seal are in place.

4.6 Spill Prevention, Control, and Countermeasures

Tasks for this project might involve waste materials containing chemicals, including materials targeted for remediation, wastes associated with operating equipment (e.g., fuel and hydraulic fluids), waste materials generated during decontamination procedures, and investigation-derived waste associated with sampling activities. Workers must implement the hazard-mitigating procedures for handling and disposing of waste materials consistent with the OU-1/OU-2 RD/RA HASP and the task-specific JSAs that will be developed to support RD/RA work. This process includes reviewing the safety data sheets for any hazardous chemicals that could be encountered during the work to ensure the appropriate spill prevention, containment, and cleanup procedures are included in the JSAs, such as the following:

1. Flat areas will be selected for storage away from high-traffic work zones and storm and sewer drains or catch basins.
2. Where spills or leaks could potentially occur, a supply of sorbents shall be located in the immediate area.
3. The upland storage area will be inspected to check for leaks on a regular basis (i.e., daily or weekly as determined in the JSA).
4. In the event of an unplanned release or spill of unknown or hazardous substances, the SSO will designate personnel or emergency spill response contractor who will support the spill containment, control, and cleanup.
5. The spill area will be isolated and restricted to only authorized personnel designated to assist with the containment, control, or cleanup activity. Authorized personnel will be trained to contain and clean spills from typical materials and quantities used at the project location.
6. Physical barriers will be set up to warn unauthorized personnel to stay clear and evacuate the affected area.
7. The spill, leak, or incident will be assessed by the SSO to determine the appropriate course(s) of action(s) that could include the following:
    a. Small spills (i.e., maximum volume of 55 gallons of liquid or 100 pounds of a solid) may be remediated using absorbent materials by designated personnel.

    b. Large spills (i.e., liquid volumes greater than 55 gallons of a liquid or 100 pounds) or spills of highly toxic materials that require the support of an emergency spill response contactor.

    c. Attempts shall be made to identify and stop the spill source(s) immediately while donning proper PPE (based on action levels and the air monitoring program) and performing air monitoring.

    d. The SSO will direct spill-response operations and stay at the spill area until it has been cleaned, inspected, and cleared for reentry.

e. The Project Manager will document the spill incident and cleanup effort.

A spill prevention control and countermeasures plan (SPCC) might be required for RD/RA work conducted under the CD as determined by key site personnel and/or contractors conducting work as part of the OU-1/OU-2 RD/RA, including PDIs, based on the location and nature of their planned efforts. If required, the SPCC will be prepared and implemented in accordance with 40 Code of Federal Regulations (CFR) Part 112 "Oil Pollution Prevention" and included as an attachment to the task-specific JSA.

4.7 Weather-Related Emergencies

The occurrence or coming of inclement weather will result in the temporary suspension of work. Work will not resume until the inclement weather has passed and the conditions are deemed safe using the 30-30 rule. The 30-30 rule includes waiting 30 minutes after the last thunder heard and lightning seen before work is resumed provided that there was less than 30 seconds between the observation of lighting and the sound of the associated thunder. In the event that Site workers are caught on the water during unforeseen inclement weather, workers must immediately stop work and evacuate via the egress points indicated in the task-specific JSA and discussed during the daily tailgate meeting. Workers will seek shelter in field vehicles or equivalent safe shelters until notified by the SSO that work may continue.

In the event that a boat breaks down during unforeseen inclement weather, unless there is a support or secondary vessel nearby to help navigate the broken-down boat, workers must paddle the boat to the nearest egress point and evacuate the Site. Once evacuated, the workers will seek shelter in field vehicles until notified by the SSO that work may continue to address the broken-down boat.

4.8 Security Emergencies

This project includes working in an urban environment and some tasks in that urban environment will require additional security. These tasks may include working at abandoned properties or after dusk. Site workers should avoid confrontation with bystanders or other unauthorized people. Should a Site worker feel endangered by a bystander, the Site worker must stop work and move to a safe location and call the local police or, if a life-threatening situation exists, call 911.

4.9 Emergency Response Actions and Reporting

Spills and releases require reporting based on the type of material, the quantity of the material, and whether there is an off-site release. The Project Manager with support from the SSO will determine if a spill or release is reportable or if it might pose an immediate threat to human health or welfare or the environment. The Project Manager will also perform the following:

- Immediately take appropriate action to prevent, abate, or minimize such release or threat of release.
- Immediately notify the authorized USEPA representative including the RPM and/or USEPA Emergency Response Unit.

- Take such actions in consultation with the authorized USEPA representative and in accordance with all applicable provisions of this ERP and OU-1/OU-2 RD/RA HASP.

Similarly, upon the occurrence of any event during performance of the RD/RA work that requires reporting pursuant to Section 103 of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 United States Code (U.S.C.) Part 9603, or Section 304 of the Emergency Planning and Community Right-to-Know Act (EPCRA), 42 U.S.C. Part 11004, the Project Manager will complete the following:

- Immediately notify the authorized USEPA representative (Project Coordinator and/or USEPA Emergency Response Unit).
- Submit a report to USEPA, within 14 days after the onset of such event, describing the actions or events that occurred and the measures taken, and to be taken.
- Submit a report to USEPA, within 30 days after the conclusion of such event, describing all actions taken in response to such event.

4.10 Post-Incident Assessment and Reporting

Following any emergency response activity, the SSO will convene a meeting of Site workers within 7 days following the final response measure to identify and discuss the following:

- Review overall strategy and tactics employed.
- Assess effectiveness of the ERP and procedures.
- Identify any problems.
- Review lessons learned.
- Recommend improvements for general and specific operations for the future, and identify potential amendment(s) to the ERP to correct identified deficiencies.

As part of conducting this assessment, information from the local community, and state and federal agencies involved in the incident may be solicited by the P/S representative. The information and findings will be presented in a written summary within 30 days of the meeting with copies of the report provided to all participants.

4.11 Meetings with Federal, State, and Local Agencies

Meetings may be held with a range of federal, state, and local agencies and organizations involved in incident response. These meetings may be held to conduct advance planning, in response to an incident and follow-up meetings to review lessons learned. The range of participants may also include local emergency squads and hospitals. Participation in these meeting would be coordinated through the P/S representative in consultation with the RPM.

4.12 Decontamination and Disposal

Decontamination procedures for equipment and personnel may be required after cleanup to eliminate traces of the substance spilled or reduce it to an acceptable level as presented in the task-specific JSAs. Personnel decontamination could include showers and cleaning or disposing of protective clothing and equipment. All contaminated materials including solvents, cloth, soil, and wood that cannot be decontaminated will be removed and disposed of in accordance with applicable federal, state, and local laws at a disposal facility that is permitted to accept the generated waste.

5. REFERENCES

Geosyntec 2021a. *OU-1/OU-2 Remedial Design Work Plan, Revision 0*. Pharmacia LLC/ Solutia Inc. June.

Geosyntec 2021b. *OU-1/OU-2 RD/RA Health and Safety Plan for the Anniston PCB Site Revision 0.* Pharmacia LLC/Solutia Inc. June.

USEPA. Section 103 of CERCLA, 42 U.S.C. Part 9603. Title 41-The Public Health and Welfare. pp 5307–5309. Available at: https://www.epa.gov/epcra/cercla-section-103-release-notification.

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USEPA. 2017. *Record of Decision Operable Unit 1/Operable Unit 2, Anniston PCB Site, Anniston, Calhoun County, Alabama*. United States Environmental Protection Agency. Atlanta Georgia. November.

USEPA. 2021. Remedial Design/Remedial Action Consent Decree. United States of America v. Pharmacia LLC, and Solutia, Inc. Civil Action No. 1:02-CV-0749-KOB. U.S. District Court Northern District of Alabama Eastern Division. Effective date: March 26.

TABLES

Table 1-1. Consent Decree Requirements for ERP
Anniston OU-1/OU-2 Emergency Response Plan
Anniston PCB Site, Anniston, Alabama

CD Section 6.7 (b)	Description	Location in ERP
(1)	Name of the person or entity responsible for responding in the event of an emergency incident	Section 3 and Table 3-1
(2)	Plan and date(s) for meeting(s) with the local community, including local, state, and federal agencies involved in the cleanup, as well as local emergency squads and hospitals	Section 4.11
(3)	Spill Prevention, Control, and Countermeasures Plan (if applicable), consistent with the regulations under 40 CFR Part 112, describing measures to prevent, and contingency plans for spills and discharges	Section 4.6
(4)	Notification activities in accordance with [Part] 4.4(b) (Release Reporting) in the event of a release of hazardous substances requiring reporting under Section 103 of CERCLA, 42 U.S.C. Part 9603, or Section 304 of the Emergency Planning and Community Right-to-Know Act, 42 U.S.C. Part 11004	Section 4.9
(5)	A description of all necessary actions to ensure compliance with Paragraph 11 (Emergency Response and Reporting) of the CD in the event of an occurrence during the Work that causes or threatens a release of Waste Material from the Site that constitutes an emergency or may present an immediate threat to public health or welfare of the environment.	Section 4.9

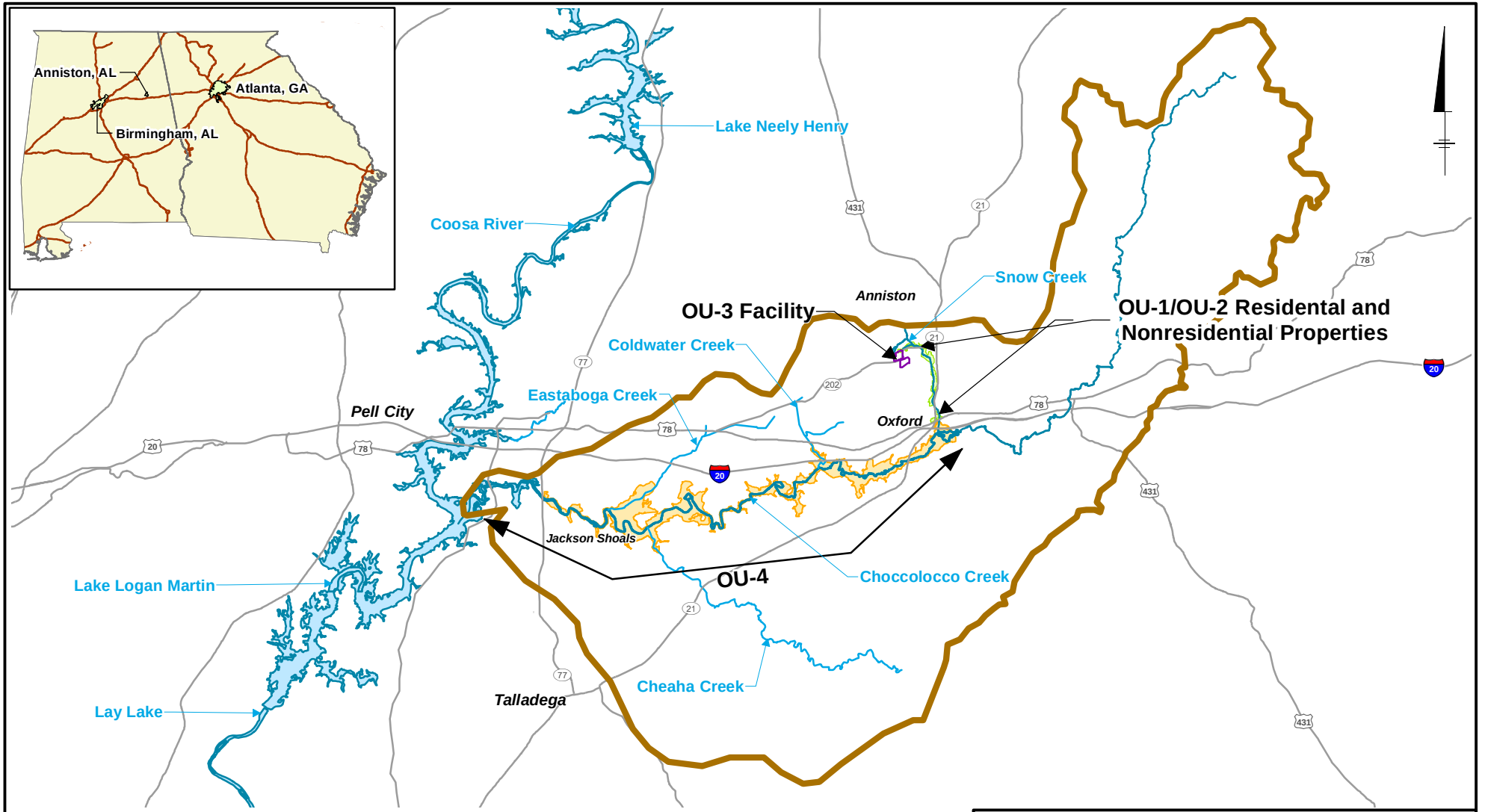
CD: Consent Decree
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
CFR: Code of Federal Regulations
ERP: emergency response plan
PCB: polychlorinated biphenyl
OU: operable unit
U.S.C. United States Code

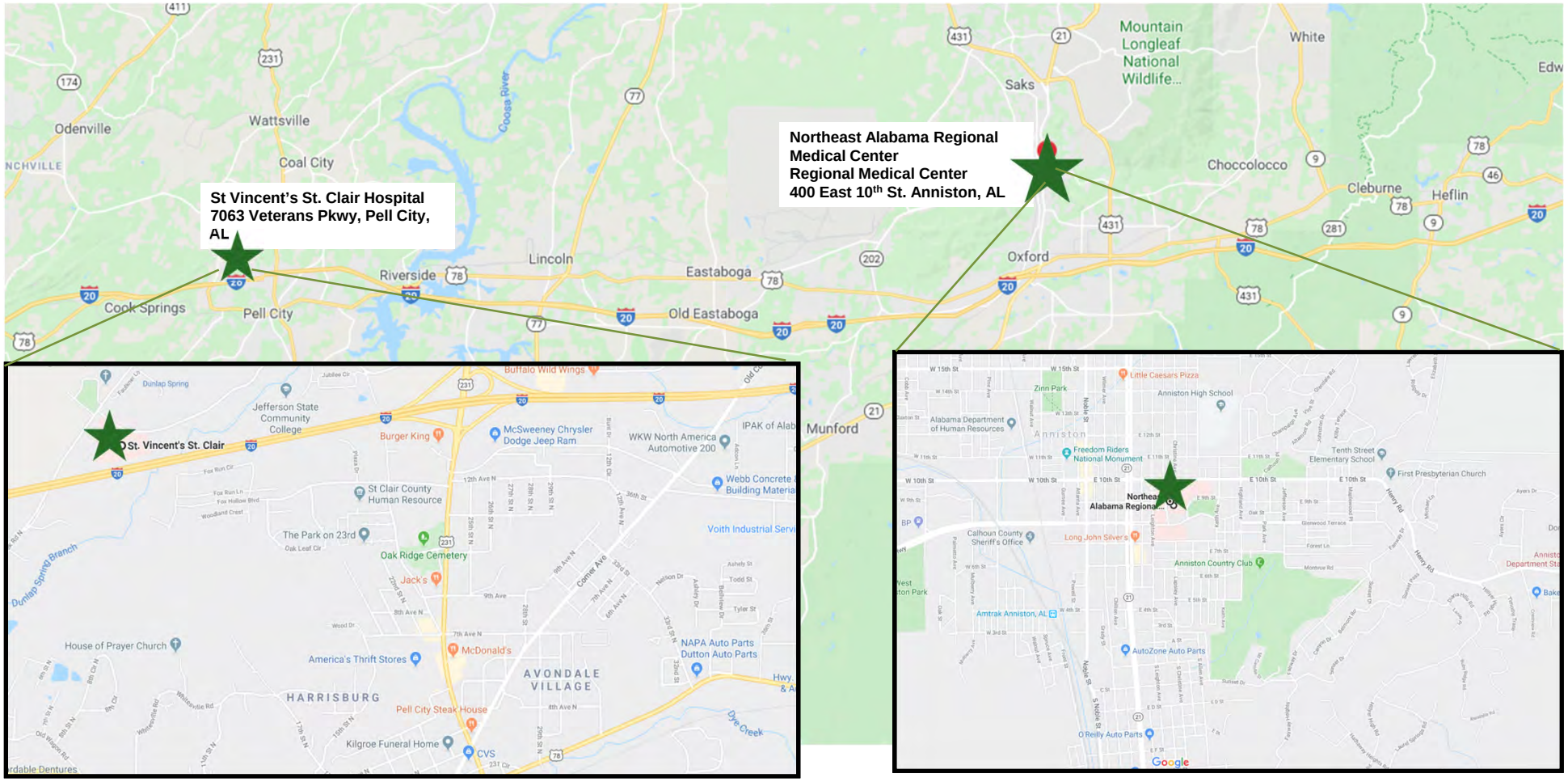
Table 3-1: Emergency and Nonemergency Contacts
Anniston OU-1/OU-2 Emergency Response Plan
Anniston PCB Site, Anniston, Alabama

EMERGENCY	
Fire	911
Police	911
Ambulance	911
NONEMERGENCY	
Anniston Fire	(256) 231-7647
Anniston Police (and animal control)	(256) 238-1800
City of Oxford Police	(256) 831-3121
City of Oxford Fire	(256) 831-3208
Calhoun County Sheriff's Office	(256) 237-4731
Calhoun County Animal Control (Cheaha Regional Humane Society)	(256) 241-3647
Talladega County Sheriff's Office	(256) 362-2748
HOSPITALS: Regional Medical Center, 400 East 10th Street, Anniston, AL 36207 St Vincent's St. Clair, 7063 Veterans Pkwy, Pell City, AL 35125	(256) 235-5121 (205) 338-3301
Alabama One Call	811
Poison Control Center	(800) 222-1222
National Response Center (chemical or oil spill)	(800) 424-8802
Alabama Department of Environmental Management Emergency Response	(205) 942-6168
USEPA Project Coordinator (Pam Scully)	(404) 562-8934
USEPA Region 4 Section Chief (Derek Matory)	(404) 562-8800
Solutia Anniston PCB Site Manager (Gayle Macolly)	(256) 231-8404

PCB: polychlorinated biphenyl
USEPA: United States Environmental Protection Agency

FIGURES


Anniston, AL
Atlanta, GA
Birmingham, AL
Lake Neely Henry
Coosa River
Snow Creek
Anniston
OU-3 Facility
OU-1/OU-2 Residental and
Nonresidential Properties
Coldwater Creek
Eastaboga Creek
Pell City
Oxford
Jackson Shoals
OU-4
Choccolocco Creek
Lake Logan Martin
Cheaha Creek
Talladega
Lay Lake
Legend
Approximate Choccolocco Creek Watershed Boundary as Delineated in Basins 2.0
OU-4 100-Year Floodplain
OU-1/OU-2 Downgradient Floodplain
OU-3 Boundary
0
6
12
Miles
Graphic Scale
Notes:
OU: operable unit
PCB: polychlorinated biphenyl
Anniston PCB Site
Anniston, Alabama
Emergency Response Plan
Site Location Map
Figure
2-1



Directions to St. Vincent's (205-338-3301)

From the East: Take I-20 W to exit 158, US -231 N/Martin Street N in Pell City. Take Hazelwood Drive and Veterans Parkway to St. Vincent's St. Clair.

Direction to Northeast Alabama Regional Medical Center (256-235-5121)

From the West: Take Highway 202 East. Pass through the intersection with Quintard Avenue, Highway 202 becomes 9th Street. The Regional Medical Center is 1.5 blocks ahead on the left.

From the South: Take Quintard Avenue North to 9th Street. Turn right on 9th Street. The Regional Medical Center is 1.5 blocks ahead on the left.

Anniston PCB Site
Anniston, Alabama
Emergency Response Plan

Medical Center Locations

Solutia

Figure 4-1

APPENDIX C
ARAR Tables from the OU-1/OU-2 ROD

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
General Construction Standards – All Land-Disturbing Activities			
Activities causing storm water runoff (e.g., clearing, grading, excavation)	Shall fully implement and regularly maintain effective BMPs to the maximum extent practicable and in accordance with the operator's Construction Best Management Plan (CBMPP).	All new and existing construction activities as defined in ADEM Admin. Code r. 335-6-12-.02(e) disturbing one (1) acre or more in size - **applicable**	ADEM Admin. Code r. 335-6-12-.05(2)
	Appropriate, effective pollution abatement/prevention facilities, structural and nonstructural BMPs, and management strategies shall be fully implemented prior to and concurrent with commencement of the regulated activities and regularly maintained during construction as needed at the site to meet or exceed the requirements of this chapter until construction is complete, effective reclamation and/or storm water quality remediation is achieved.		
	The operator shall take all reasonable steps to prevent and/or minimize, to the maximum extent practicable, any discharge in violation of this chapter or which has a reasonable likelihood of adversely affecting the quality of groundwater or surface water receiving the discharge(s).		ADEM Admin. Code r. 335-6-12-.06(4)
	Implement a comprehensive CBMPP appropriate for site conditions consistent with the substantive requirements of ADEM Admin. Code r. 335-6-12-.21 that has been prepared and certified by a Qualified Credentialed Professional.		ADEM Admin. Code r. 335-6-12-.21(2)(a)
	The CBMPP shall include a description of appropriate, effective water quality BMPs to be implemented at the site as needed to ensure compliance with this chapter and include but not be limited to the measures provided in subsections 1 through 14.		ADEM Admin. Code r. 335-6-12-.21(2)(b)
	BMPs shall be designed, implemented, and regularly maintained to provide effective treatment of discharges of pollutants in storm water resulting from runoff generated by probable storm events expected/predicted during construction disturbance based on historic precipitation information, and during extended periods of adverse weather and seasonal conditions.		ADEM Admin. Code r. 335-6-12-.21(4)

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Activities causing fugitive dust emissions	Shall not cause, suffer, allow or permit any materials to be handled, transported, or stored; or a building, its appurtenances, or a road to be used . . . without taking reasonable precautions to prevent particulate matter from becoming airborne.	Fugitive emissions from construction operations, grading, or the clearing of land – **TBC**	ADEM Admin. Code r. 335-3-4-.02(1)[1]
	Shall not cause or permit the discharge of visible fugitive dust emissions beyond the lot line of the property on which the emissions originate.		ADEM Admin. Code r. 335-3-4-.02(2)[2]
Groundwater Monitoring/Extraction Well Installation, Operation, and Abandonment			
Construction of extraction and monitoring wells	All materials used in the construction of a water well shall have the structural strength to accomplish the purpose for which they are installed.	Installation of wells as defined in ADEM Admin. Code r. 335-9-1-.02(g) – **relevant and appropriate**	ADEM Admin. Code r. 335-9-1-.05(a)- (c)
	Must meet any relevant substantive requirements under ADEM Admin. Code r. 335-9-1.-.05 Materials and Admin. Code r. 335-9-1.-.06 Construction Standards related to casings, liners, screens, development, and capping of wells.		ADEM Admin. Code r. 335-9-1-.06(a), (b), (c), (d), (e) & (h)
	Any holes remaining after construction or testing attempts shall be properly backfilled.		ADEM Admin. Code r. 335-9-1-.06(h)
Construction of monitoring wells	Must be cased in a manner that maintains the integrity of the monitoring well bore hole. This casing must be screened or perforated and packed with gravel or sand, where necessary, to enable sample collection at depths where appropriate aquifer flow zones exist. The annular space (i.e., the space between the bore hole and well casing) above the sampling depth must be sealed with a suitable material (e.g., cement grout or bentonite slurry) to prevent contamination of samples and the groundwater.	Installation of groundwater monitoring wells at a RCRA facility in order to detect any statistically significant amounts of hazardous waste or hazardous waste constituents – **relevant and appropriate**	ADEM Admin. Code r. 335-14-5-.06(8)(c)
	Monitoring wells must be operated and maintained in a manner to prevent soil, surface water, and/or groundwater contamination. This requirement includes the installation of protective barriers around monitoring wells, where necessary, to prevent damage to the well from traffic or other causes.		
	All monitoring wells must have functional key or combination locks on the wellhead covers to prevent unauthorized access. All monitoring wells must be assigned an identifying number by the facility, and such numbers must be permanently affixed to the outer casing of each monitoring well.		
Abandonment of extraction wells, monitoring wells, and boreholes	Any well to be abandoned shall be permanently sealed in the following manner: The well must be filled with a puddled clay material containing 50 ppm of chlorine to within 20 feet of the top of the well. The top 20 feet shall be filled with cement grout or concrete.	Abandonment of extraction wells, monitoring wells, and boreholes – **relevant and appropriate**	ADEM Admin. Code r. 335-9-1-.06(g)

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Waste Generation, Characterization, Segregation, and Storage—Primary Wastes (e.g., excavated soils) and Secondary Wastes (e.g., treatment residues)			
Characterization of solid waste (all primary and secondary wastes) (e.g. excavated sediment and soil)	Must determine if solid waste is excluded from regulation under 40 C.F.R. § 261.4(b); and	Generation of solid waste as defined in 40 C.F.R. § 261.2 —**applicable**	40 C.F.R. § 262.11(a)
	Must determine if waste is listed as hazardous waste under subpart D 40 C.F.R. Part 261; or	Generation of solid waste which is not excluded under 40 C.F.R. § 261.4(a) — **applicable**	40 C.F.R.§ 262.11(b)
Characterization of solid waste (all primary and secondary wastes) cont. (e.g. excavated sediment and soil)	Must determine whether the waste is (characteristic waste) identified in subpart C of 40 C.F.R. part 261 by either: (1) Testing the waste according to the methods set forth in subpart C of 40 C.F.R. part 261, or according to an equivalent method approved by the Administrator under 40 C.F.R. 260.21; or (2) Applying knowledge of the hazard characteristic of the waste in light of the materials or the processes used.		40 C.F.R. § 262.11(c)
	Must refer to Parts 261, 262, 264, 265, 266, 268, and 273 of Chapter 40 for possible exclusions or restrictions pertaining to management of the specific waste.	Generation of solid waste which is determined to be hazardous waste – **applicable**	40 C.F.R. § 262.11(d)
Characterization of RCRA hazardous waste (all primary and secondary wastes) (e.g. excavated sediment and soil)	Must obtain a detailed chemical and physical analysis on a representative sample of the waste(s), which at a minimum contains all the information that must be known to treat, store, or dispose of the waste in accordance with pertinent sections of 40 C.F.R. Parts 264 and 268.	Generation of RCRA hazardous waste for storage, treatment, or disposal – **applicable**	40 C.F.R. § 264.13(a)(1)

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Determinations for management of RCRA hazardous waste (e.g. excavated sediment and soil)	Must determine if the hazardous waste has to be treated before land disposal. This is done by determining if the waste meets the treatment standards in 40 CFR 268.40, 268.45, or 268.49 by testing in accordance with prescribed methods or use of generator knowledge of waste. This determination can be made concurrently with the hazardous waste determination required in 40 CFR 262.11.	Generation of RCRA hazardous waste for storage, treatment or disposal - **applicable**	40 C.F.R. § 268.7(a)(1)
	Must comply with the special requirements of 40 CFR 268.9 in addition to any applicable requirements in 40 CFR 268.7.	Generation of waste or soil that displays a hazardous characteristic of ignitability, corrosivity, reactivity, or toxicity for storage, treatment or disposal - **applicable**	40 C.F.R. § 264.7(a)(1)
Determinations for management of RCRA hazardous waste (e.g. excavated sediment and soil)	Must determine each USEPA Hazardous Waste Number (waste code) applicable to the waste in order to determine the applicable treatment standards under 40 C.F.R. 268 et seq. Note: This determination may be made concurrently with the hazardous waste determination required in Sec. 262.11 of this chapter.	Generation of RCRA characteristic hazardous waste for storage, treatment, or disposal – **applicable**	40 C.F.R. § 268.9(a)
	Must determine the underlying hazardous constituents [as defined in 40 C.F.R. § 268.2(i)] in the characteristic waste.	Generation of RCRA characteristic hazardous waste (and is not D001 non-wastewaters treated by CMBST, RORGS, or POLYM of Section 268.42 Table 1) for storage, treatment, or disposal **– applicable**	40 C.F.R. § 268.9(a)
	Must determine if the hazardous waste meets the treatment standards in 40 C.F.R. 268.40, 268.45, or 268.49 by testing in accordance with prescribed methods or use of generator knowledge of waste. Note: This determination can be made concurrently with the hazardous waste determination required in 40 C.F.R. 262.11.		40 C.F.R. § 268.9(a)
Temporary on-site storage of RCRA hazardous waste in containers (e.g. excavated sediment and soil)	A generator may accumulate hazardous waste at the facility provided that:	Accumulation of RCRA hazardous waste on-site as defined in 40 C.F.R. § 260.10 – **applicable**	40 C.F.R. § 262.34(a)
	• Waste is placed in containers that comply with 40 C.F.R. §§ 265.171-173; and		40 C.F.R. § 262.34(a)(1)(i)
	• The date upon which accumulation begins is clearly marked and visible for inspection on each container; and		40 C.F.R. § 262.34(a)(2)
	• Container is marked with the words "hazardous waste"; or	Accumulation of 55 gallons or less of RCRA hazardous waste	40 C.F.R. § 264.34(a)(3)

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
	• Container may be marked with other words that identify the contents.	or 1 quart of acutely hazardous waste listed in 261.33(e) at or near any point of generation – **applicable**	40 C.F.R. § 262.34(c)(1)
Use and management of RCRA hazardous waste in containers (e.g. excavated sediment and soil)	If container is not in good condition (e.g., severe rusting, structural defects) or if it begins to leak, must transfer waste into a container in good condition.	Storage of RCRA hazardous waste in containers – **applicable**	40 C.F.R. § 265.171
	Use container made or lined with materials compatible with waste to be stored so that the ability of the container is not impaired.		40 C.F.R. § 265.172
	Keep containers closed during storage, except to add/remove waste.		40 C.F.R. § 265.173(a)
	Open, handle, and store containers in a manner that will not cause containers to rupture or leak.		40 C.F.R. § 265.173(b)
Storage of RCRA hazardous waste in container area (e.g. excavated sediment and soil)	Area must have a containment system designed and operated in accordance with 40 C.F.R. § 264.175(b).	Storage of RCRA hazardous waste in containers with free liquids – **applicable**	40 C.F.R. § 264.175(a)
	Area must be sloped or otherwise designed and operated to drain liquid from precipitation, or containers must be elevated or otherwise protected from contact with accumulated liquid.	Storage of RCRA hazardous waste in containers that do not contain free liquids (other than F020, F021, F022, F023, F026 and F027) – **applicable**	40 C.F.R. § 264.175(c)(1)(2)
Closure performance standard for RCRA container storage unit	Must close the facility (e.g., container storage unit) in a manner that: • Minimizes the need for further maintenance; • Controls minimizes or eliminates to the extent necessary to protect human health and the environment, post–closure escape of hazardous waste, hazardous constituents, leachate, contaminated run –off, or hazardous waste decomposition products to the ground or surface waters or the atmosphere; and • Complies with the closure requirements of subpart, but not limited to, the requirements of 40 CFR 264.178 for containers.	Storage of RCRA hazardous waste in containers **– applicable**	40 CFR § 264.111

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Closure of RCRA container storage unit (e.g. excavated sediment and soil)	At closure, all hazardous waste and hazardous waste residues must be removed from the containment system. Remaining containers, liners, bases, and soils containing or contaminated with hazardous waste and hazardous waste residues must be decontaminated or removed. [Comment: At closure, as throughout the operating period, unless the owner or operator can demonstrate in accordance with 40 CFR 261.3(d) of this chapter that the solid waste removed from the containment system is not a hazardous waste, the owner or operator becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of parts 262 through 266 of this chapter].	Storage of RCRA hazardous waste in containers in a unit with a containment system – **applicable**	40 C.F.R. § 264.178
Temporary on-site storage of remediation waste in RCRA staging piles (e.g., excavated sediment and soil)	Must be located within the contiguous property under the control of the owner/operator where the wastes are to be managed in the staging pile originated.	Accumulation of *solid non-flowing hazardous remediation waste* (or remediation waste otherwise subject to land disposal restrictions) as defined in 40 C.F.R. § 260.10 – **applicable** Storage of remediation waste in a staging pile - **applicable**	40 C.F.R. § 264.554(a)(1)
	For purposes of this section, temporary storage includes mixing, sizing, blending or other similar physical operations so long as intended to prepare the wastes for subsequent management or treatment at a facility if used only during remedial operations.		40 C.F.R. § 264.554(a)(1)
	Staging piles may be used to store hazardous remediation waste (or remediation waste otherwise subject to land disposal restrictions) based on approved standards and design criteria designated for that staging pile. *NOTE*: Design and standards of the staging pile should be included in CERCLA Remedial Design document approved or issued by EPA.		40 C.F.R. § 264.554(b)
Performance criteria for RCRA staging pile	• Must facilitate a reliable, effective, and protective remedy;		40 C.F.R. § 264.554(d)(1)(i)
	• Must be designed to prevent or minimize releases of hazardous wastes and constituents into the environment, and minimize or adequately control cross-media transfer as necessary to protect human health and the environment (e.g., use of liners, covers, run-off/run-on controls); and		40 C.F.R. § 264.554(d)(1)(ii)
	• Must not operate for more than 2 years, except when an operating term extension under 40 C.F.R. 264.554(i) is granted. • Note: Must measure the 2-year limit (or other operating term specified) from first time remediation waste is placed in staging pile.		40 C.F.R. § 264.554(d)(1)(iii) 40 C.F.R. § 264.554(h)
	• Must not use staging pile longer than the length of time designated by USEPA in appropriate decision document.		40 C.F.R. § 264.554(i)(1)

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Design criteria for RCRA staging pile	Extension of up to an additional 180 days beyond the operating term limit may be granted provided the continued operation of the staging pile: • Will not pose a threat to human health and the environment; and • Is necessary to ensure timely and efficient implementation of remedial actions at the facility.		40 C.F.R. 264.554(i)(1)(i) and (ii)
	In setting standards and design criteria, must consider the following factors: • Length of time pile will be in operation; • Volumes of waste you intend to store in the pile; • Physical and chemical characteristics of the wastes to be stored in the unit; • Potential for releases from the unit; • Hydrogeological and other relevant environmental conditions at the facility that may influence the migration of any potential releases; and • Potential for human and environmental exposure to potential releases from the unit.		40 C.F.R. § 264.554(d)(2)(i) –(vi)
Operation of a RCRA staging pile	Must not place ignitable or reactive remediation waste in a staging pile unless the remediation waste has been treated, rendered, or mixed before placed in the staging pile so that: • The remediation waste no longer meets the definition of ignitable or reactive under 40 C.F.R. 261.21 or 40 C.F.R. 261.23; and • You have complied with 40 C.F.R. §264.17(b); or	Storage of ignitable or reactive remediation waste in staging pile – **applicable**	40 C.F.R. §264.554(e) 40 C.F.R. §264.554(e)(1)(i) and (ii)
	• Must manage the remediation waste to protect it from exposure to any material or condition that may cause it to ignite or react.		40 C.F.R. §264.554(e)(2)
	Must not place in the same staging pile unless you have complied with 40 C.F.R. § 264.17(b).	Storage of "incompatible" remediation waste (as defined in 40 C.F.R. § 260.10) in staging pile – **applicable**	40 C.F.R. § 264.554(f)(1)
	Must separate the incompatible waste or materials or protect them from one another by using a dike, berm, wall, or other device.	Staging pile of remediation waste stored nearby to incompatible wastes or materials in containers, other piles, open tanks or land disposal units – **applicable**	40 C.F.R. § 264.554(f)(2)
	Must not pile remediation waste on same base where incompatible wastes or materials were previously piled unless you have sufficiently decontaminated the base to comply with 40 C.F.R. § 264.17(b).		40 C.F.R. § 264.554(f)(3)

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Closure of staging piles of RCRA remediation waste	Must be closed within 180 days after the operating term by removing or decontaminating all remediation waste, contaminated containment system components, and structures and equipment contaminated with waste and leachate.	Storage of remediation waste in a staging pile in a previously contaminated area – **applicable**	40 C.F.R. § 264.554(j)(1)
	Must decontaminate contaminated subsoils in a manner that USEPA determines will protect human health and the environment.		40 C.F.R. § 264.554(j)(2)
	Must be closed within 180 days after the operating term according to 40 C.F.R. §§ 264.258(a) and 264.111, or 265.258(a) and 265.111.	Storage of remediation waste in a staging pile in an uncontaminated area – **applicable**	40 C.F.R. § 264.554(k)
Waste Treatment and Disposal — Contaminated Groundwater, Excavated Soils, Debris, and Secondary Wastes			
Discharge to surface water	These standards govern discharge of water into surface waters. Due to the degraded nature of Snow Creek, regulated discharges into the waterway must meet ambient water quality criteria at the discharge point. There is a prohibition on new discharges into waters that do not meet applicable water quality criteria unless certain conditions are met.	NPDES requirements for point source discharges to surface water (e.g., Snow Creek) – **relevant and appropriate**	33 U.S.C. 1342; 40 C.F.R. 131 40 C.F.R. 122.4(i)
General duty to mitigate for discharge	Take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of effluent standards which has a reasonable likelihood of adversely affecting human health or the environment.	Discharge of pollutants to surface waters of the State – **applicable**	40 CFR § 122.41(d)
Operation and maintenance of treatment system	Properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used to achieve compliance with the effluent standards. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures.	Discharge of pollutants to surface waters of the State – **applicable**	40 CFR § 122.41(e)

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Technology-based treatment requirements for wastewater discharge	To the extent that EPA promulgated effluent limitations are inapplicable, develop on a case-by-case Best Professional Judgment (BPJ) basis under Section 402(a)(1)(B) of the CWA, technology based effluent limitations by applying the factors listed in section 125.3(d) and shall consider: • The appropriate technology for this category or class of point sources, based upon all available information; and Any unique factors relating to the discharger.	Discharge of pollutants to surface waters from other than a POTW – **applicable**	40 CFR § 125.3(c)(2)
Water quality-based effluent limits for wastewater discharge	Must develop water quality based effluent limits that ensure that: • The level of water quality to be achieved by limits on point source(s) established under 40 CFR § 122.44(d)(1)(vii) is derived from, and complies with all applicable water quality standards; and • Effluent limits developed to protect narrative or numeric water quality criteria are consistent with the assumptions and any available waste load allocation for the discharge prepared by the State and approved by EPA pursuant to 40 *CFR* § 130.7.	Discharge of pollutants to surface waters that causes, or has reasonable potential to cause, or contributes to an instream excursion above a narrative or numeric criteria within a State water quality standard – **applicable**	40 CFR § 122.44(d)(1)(vii)
Monitoring requirements for discharges	In addition to 40 CFR § 122.48 (a) and (b) and to assure compliance with effluent limitations requirements to monitor, one must monitor, as appropriate, according to the substantive requirements provided in 40 CFR § 122.44(i)(1)(i) through (iv). *NOTE:* Monitoring location and frequency will be conducted in accordance with CERCLA Remedial Action Work Plan.	Discharge of pollutants to surface waters – **applicable**	40 CFR § 122.44(i)(1) 40 CFR § 122.44(i)(2)
	All effluent limitations, standards and prohibitions shall be established for each outfall or discharge point, except as provided under 40 CFR § 122.44(k).		
	All effluent limitations, standards and prohibitions, including those necessary to achieve water quality standards, shall unless impracticable be stated as: Maximum daily and average monthly discharge limitations for all discharges	Continuous discharge of pollutants to surface waters – **applicable**	

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Discharge of PCB contaminated water	For water discharged to a treatment works (as defined in 40 CFR § 503.9 (aa), or to navigable waters, meet standard of < 3 ppb PCBs; Or a PCB discharge limit included in a permit issued under section 307(b) or 402 of the Clean Water Act.	Water containing PCBs regulated for disposal – **applicable**	40 CFR § 761.79(b)(1)(ii) 40 CFR § 761.450(a)(3)
Discharge of treated groundwater to surface water	Comply with any applicable substantive water quality requirements under the Alabama Water Pollution Control Act or the CWA including application of technology- or ambient water quality-based effluent limitations to ensure discharge does not cause or contribute to violation of water quality standards.	Discharge of pollutants into waters of the State – **applicable**	ADEM Admin. Code r. 335-6-6-.04(f), (h), (i), and (j)
	Conditions for the discharge shall meet the requirements, as appropriate, provided in ADEM Admin. Code r. 335-6-6-.14 such as the following: • Technology-based effluent limitations and standards under Sections 301, 302, 303, 304, 307, 318, and 405 of the CWA, including any applicable toxic effluent standard or prohibition under 40 C.F.R. Subchapter N. • Other requirements in addition to or more stringent than promulgated effluent limitations, guidelines, or standards under Sections 301, 306, 307, 318, and 405 of the CWA where necessary to achieve water quality standards established under Section 303 of the CWA and Alabama Water Pollution Control Act §2-22-9(g)		ADEM Admin. Code r. 335-6-6-.14 (3)(a), (b), (e)
	Limitations must be applied to control all pollutants or pollutant parameters that are or may be discharged at a level which cause, have reasonable potential to cause, or contribute to an exceedance of a narrative or numerical water quality standard.		ADEM Admin. Code r. 335-6-6-.14(e)(1)(i)
Discharge to POTW	Discharge of pollutants that pass through POTW without treatment, interfere with POTW operation, contaminate POTW sludge, or endanger health/safety of POTW workers, is prohibited. Discharge must comply with local POTW pretreatment program, including POTW-specific pollutants, spill prevention program requirements, and reporting and monitoring requirements.	Discharge to a POTW – **relevant and appropriate**	40 C.F.R. 403.5 and local POTW regulations 40 C.F.R. 270.60

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Discharge of treated groundwater to POTW	Shall not introduce into publicly or privately owned treatment works any pollutant(s) which, alone or in conjunction with a discharge or discharges from other sources, cause pass through or interference or in any other manner adversely impact the operation or performance of the treatment works, to include the method of sludge disposal in use by the publicly or privately owned treatment works.	Discharge pollutants into POTW or privately owned treatment facility operated by a person other than the indirect discharger – **applicable**	ADEM Admin. Code r. 335-6-5-.03(1)
	The following pollutants may not be introduced into a POTW:		ADEM Admin. Code r. 335-6-5-.03(2)
	• Pollutants which create a fire or explosion hazard in the POTW, including, but not limited to, waste streams with a closed cup flashpoint of less than 140 degrees Fahrenheit (°F) or 60 degrees Centigrade (°C) using the test methods specified in 40 C.F.R. § 261.21;		ADEM Admin. Code r. 335-6-5-.03(2)(a)
	• Pollutants which will cause corrosive structural damage to the treatment works, but in no case discharges with pH lower than 5.0, unless the treatment works are specifically designed to accommodate such discharges;		ADEM Admin. Code r. 335-6-5-.03(2)(b)
	• Solid or viscous pollutants in amounts which will cause obstruction to the flow in sewers, or other interference with the operation of the treatment works;		ADEM Admin. Code r. 335-6-5-.03(2)(c)
	• Any pollutant, including oxygen demanding pollutants released in a discharge of such volume or strength as to cause interference in the treatment works;		ADEM Admin. Code r. 335-6-5-.03(2)(d)
	• Heat in amounts which will inhibit biological activity in the treatment plant resulting in interference but in no case in such quantities that the temperature of the influent, at the treatment plant, exceeds 40 °C (104 °F) unless the treatment plant is designed to accommodate such heat;		ADEM Admin. Code r. 335-6-5-.03(2)(e)
	• Pollutants which result in the presence of toxic gases, vapors, or fumes within the treatment works in a quantity that may cause acute worker health and safety problems;		ADEM Admin. Code r. 335-6-5-.03(2)(f)
	• Any trucked or hauled pollutants, except at discharge points designated by the treatment works; and		ADEM Admin. Code r. 335-6-5-.03(2)(g)
	• Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through.		ADEM Admin. Code r. 335-6-5-.03(2)(h)
Disposal of RCRA hazardous waste in a land-based unit	May be land disposed if it meets the requirements in the table "Treatment Standards for Hazardous Waste" at 40 C.F.R. § 268.40 before land disposal.	Land disposal, as defined in 40 C.F.R. § 268.2, of restricted RCRA waste – **applicable**	40 C.F.R. § 268.40(a)

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
(e.g. off-site permitted landfill)	All underlying hazardous constituents [as defined in 40 C.F.R. 268.2(i)] must meet the Universal Treatment Standard (UTS), found in 40 C.F.R. 268.48 Table UTS prior to land disposal.	Land disposal of restricted RCRA characteristic wastes (D001-D043) that are not managed in a wastewater treatment system that is regulated under the CWA, that is CWA equivalent, or that is injected into a Class I nonhazardous injection well – **applicable**	40 C.F.R. §268.40(e)
Disposal of RCRA hazardous waste in a land-based unit (e.g. off-site permitted landfill)	To determine whether a hazardous waste identified in this section exceeds the applicable treatment standards of 40 CFR § 268.40, the initial generator must test a sample of the waste extract or the entire waste, depending on whether the treatment standards are expressed as concentration in the waste extract or waste, or the generator may use knowledge of the waste. If the waste contains constituents (including UHCs in the characteristic wastes) in excess of the applicable UTS levels in 40 CFR § 268.48, the waste is prohibited from land disposal, and all requirements of part 268 are applicable, except as otherwise specified.	Land disposal of RCRA toxicity characteristic wastes (D004 – D011) that are newly identified (i.e., wastes, soil, or debris identified by the TCLP but not the Extraction Procedure) – **applicable**	40 C.F.R. § 268.34(f)
Disposal of RCRA *hazardous waste soil* in a land-based unit (e.g. off-site permitted landfill)	Must be treated according to the alternative treatment standards of 40 C.F.R. § 268.49(c) or according to the universal treatment standards [specified in 40 C.F.R. § 268.48 Table UTS] applicable to the listed and/or characteristic waste contaminating the soil prior to land disposal.	Land disposal, as defined in 40 C.F.R. 268.2, of restricted hazardous soils – **applicable**	40 C.F.R. § 268.49(b)
Treatment of RCRA *hazardous waste soil*	Prior to land disposal, all "constituents subject to treatment" as defined in 40 C.F.R. § 268.49(d) must be treated as follows:	Treatment of restricted hazardous waste soils – **applicable**	40 C.F.R. § 268.49(c)(1)
	• For nonmetals (except carbon disulfide, cyclohexanone, and methanol), treatment must achieve a 90% reduction in total constituent concentrations, except as provided in 40 C.F.R. § 268.49(c)(1)(C).		40 C.F.R. § 268.49(c)(1)(A)

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
	• For metals and carbon disulfide, cyclohexanone, and methanol), treatment must achieve a 90% reduction in total constituent concentrations as measured in leachate from the treated media (tested according to toxicity characteristic leaching procedure or 90% reduction in total constituent concentrations (when a metal removal technology is used), except as provided in 40 C.F.R. § 268.49(c)(1)(C). • When treatment of any constituent subject to treatment to a 90% reduction standard would result in a concentration less than 10 times the universal treatment standard for that constituent, treatment to achieve constituent concentrations less than 10 times the universal treatment standard is not required. [UTSs are identified in 40 C.F.R. § 268.48 Table UTS]. Note: Treatment required for soils considered hazardous waste is expected to be performed at an off-site RCRA permitted facility prior to disposal.		40 C.F.R. § 268.49(c)(1)(B) 40 C.F.R. § 268.49(c)(1)(C)
	In addition to the treatment requirement required by paragraph (c)(1) of this section, soils must be treated to eliminate these characteristics.	Land disposal of soils that exhibit the characteristic of ignitability, corrosivity, or reactivity – **applicable**	40 C.F.R. § 268.49(c)(2)
	Provides methods on how to demonstrate compliance with the alternative treatment standards for contaminated soils that will be land disposed.	On-site treatment of restricted hazardous waste soils following alternative soil treatment of 40 C.F.R. § 268.49(c) –**TBC**	Guidance on Demonstrating Compliance with the LDR Alternative Soil Treatment Standards [EPA 530-R-02-003, July 2002]

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
PCB Waste Generation, Management, Storage and Disposal			
Management of PCB waste (e.g., contaminated PPE, equipment, wastewater)	Any person storing or disposing of PCB waste must do so in accordance with 40 C.F.R. § 761, Subpart D.	Generation of waste containing PCBs at concentrations ≥50 ppm – **applicable**	40 C.F.R. § 761.50(a)
Management of PCB remediation waste	Any person cleaning up and disposing of PCBs shall do so based on the concentration at which the PCBs are found.	Generation of PCB remediation waste as defined in 40 C.F.R. § 761.3 – **applicable**	40 C.F.R. § 761.61
Temporary storage of PCB waste in a container(s)	Container(s) shall be marked as illustrated in 40 C.F.R. § 761.45(a).	Storage of PCBs and PCB Items at concentrations ≥50 ppm for disposal – **applicable**	40 C.F.R. § 761.40(a)(1)
	Storage area must be properly marked as required by 40 C.F.R. § 761.40(a)(10).		40 C.F.R. § 761.65(c)(3)
	Any leaking PCB items and their contents shall be transferred immediately to a properly marked non-leaking container(s).		40 C.F.R. § 761.65(c)(5)
	Container(s) shall be in accordance with requirements set forth in DOT HMR at 49 C.F.R. §§ 171-180.		40 C.F.R. § 761.65(c)(6)
Storage of PCB waste in *non-RCRA regulated unit* (Facility)	Storage facility must have: • Adequate roof and walls to prevent rainwater from reaching stored PCBs and PCB items; • Adequate floor that has continuous curbing with a minimum six-inch-high curb. Floor and curb must provide a containment volume equal to at least two times the internal volume of the largest PCB article or container or 25% of the internal volume of all articles or containers stored there, whichever is greater; • No drain valves, floor drains, expansion joints, sewer lines, or other openings that would permit liquids to flow from curbed area; • Floors and curbing constructed of Portland cement, concrete, or a continuous, smooth, nonporous surface that prevents or minimizes penetration of PCBs; and • Storage facility must not be located at a site that is below the 100-year flood water elevation. • Storage area must be properly marked as required by 40 C.F.R. § 761.40(a)(10).	Storage of PCBs and PCB items at concentrations of 50 ppm or greater for disposal – **applicable**	40 C.F.R. § 761.65(b)(1) 40 C.F.R. § 761.65(b)(1)(i) 40 C.F.R. § 761.65(b)(1)(ii) 40 C.F.R. § 761.65(b)(1)(iii) 40 C.F.R. § 761.65(b)(1)(iv) 40 C.F.R. § 761.65(b)(1)(v) 40 C.F.R. § 761.65(c)(3)

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Storage of PCB waste in a *RCRA-regulated* container storage area	Does not have to meet storage unit requirements in 40 C.F.R. § 761.65(b)(1) provided unit:	Storage of PCBs and PCB Items designated for disposal – **applicable**	40 C.F.R. § 761.65(b)(2)
	• Is permitted by USEPA under RCRA § 3004 to manage hazardous waste in containers and spills of PCBs cleaned up in accordance with Subpart G of 40 C.F.R. § 761; or		40 C.F.R. § 761.65(b)(2)(i)
	• Qualifies for interim status under RCRA § 3005 to manage hazardous waste in containers and spills of PCBs cleaned up in accordance with Subpart G of 40 C.F.R. § 761; or		40 C.F.R. § 761.65(b)(2)(ii)
	• Is permitted by an authorized state under RCRA § 3006 to manage hazardous waste in containers and spills of PCBs cleaned up in accordance with Subpart G of 40 C.F.R. § 761. • PCB spills cleaned up in accordance with Subpart G of 40 CFR 761. NOTE: Storage unit meeting the requirements of the RCRA ARARs for container storage units identified above would qualify as "interim status".		40 C.F.R. § 761.65(b)(2)(iii) 40 C.F.R. § 761.65(b)(2)(iv)
Temporary storage of Bulk PCB remediation waste in a TSCA waste pile (e.g. excavated soil)	May be stored at the cleanup site or site of generation for 180 days subject to the following conditions: • Waste must be placed in a pile designed and operated to control dispersal by wind, where necessary, by means other than wetting;	Storage of PCB remediation waste or PCB bulk product waste in a waste pile at a cleanup site or site of generation for up to 180 days – **applicable**	40 C.F.R. § 761.65(c)(9)(i)
	• Waste must not generate leachate through decomposition or other reactions.		40 C.F.R. § 761.65(c)(9)(ii)
	Storage site must have a liner designed, constructed, and installed to prevent any migration of wastes off or through liner into adjacent subsurface soil, groundwater or surface water at any time during the active life (including closure period) of the storage site.		40 C.F.R. § 761.65(c)(9)(iii)(A)
Construction of a TSCA storage pile liner	Liner must be: • Constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure because of pressure gradients, physical contact with waste or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation;		40 C.F.R. § 761.65(c)(9)(iii)(A)(1)

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Construction of a TSCA storage pile cover	• Placed on foundation or base capable of providing support to liner and resistance to pressure gradients above and below the liner to present failure because of settlement compression or uplift; and		40 C.F.R. § 761.65(c)(9)(iii)(A)(2)
	• Installed to cover all surrounding earth likely to be in contact with waste.		40 C.F.R. § 761.65(c)(9)(iii)(A)(3)
Construction of TSCA storage pile run-on control system	The storage site must have a cover that meets the above requirements and is installed to cover all of the stored waste likely to be contacted by precipitation, and is secured so as not to be functionally disabled by winds expected under normal weather conditions at the storage site; and		40 C.F.R. § 761.65(c)(9)(iii)(B)
	The storage site must have a run-on control system designed, constructed, operated and maintained such that it:		40 C.F.R. § 761.65(c)(9)(iii)(C)
	• Prevents flow on the stored waste during peak discharge from at least a 25-year storm; and		40 C.F.R. § 761.65(c)(9)(iii)(C)(1)
	• Collects and controls at least the water volume resulting from a 24-hour, 25-year storm. Collection and holding facilities (e.g., tanks or basins) must be emptied or otherwise managed expeditiously after storms to maintain design capacity of the system.		40 C.F.R. § 761.65(c)(9)(iii)(C)(2)
Modification of TSCA waste pile requirements	Requirements of 40 C.F.R. § 761.65(c)(9) may be modified under the risk-based disposal option of 40 C.F.R. § 761.61(c). NOTE: See ARAR entry below for requirements associated with use of 40 C.F.R. § 761.61(c).		40 C.F.R. § 761.65(c)(9)(iv)

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
PCB Treatment/Disposal			
Disposal of decontamination waste and residues	Such waste shall be disposed of at their existing PCB concentration unless otherwise specified in 40 C.F.R. § 761.79(g)(1) – (6).	Decontamination waste and residues – **applicable**	40 C.F.R. § 761.79(g)
	Are regulated for disposal as PCB remediation waste.	Distillation bottoms or residues and filter media – **applicable**	40 C.F.R. § 761.79(g)(1)
	Are regulated for disposal at their original concentration.	PCBs physically separated from regulated waste during decontamination, other than distillation bottoms and filter media – **applicable**	40 C.F.R. § 761.79(g)(2)
	Shall be disposed of in accordance with provisions for wastes from cleanup of PCB remediation waste at 40 C.F.R. § 761.61(a)(5)(v).	Non-liquid cleaning materials and PPE at any concentration of PCBs, including non-porous surfaces and other non-liquid materials (e.g. rags, gloves, booties) resulting from decontamination - **applicable**	40 C.F.R. § 761.79(g)(6)
Disposal of bulk PCB remediation waste off-site (self-implementing option)	May be sent off-site for decontamination or disposal provided the waste is either dewatered on-site or transported off-site in containers meeting the requirements of DOT HMR at 49 CFR parts 171-180.	Generation of bulk PCB remediation waste (as defined in 40 CFR 761.3) for disposal **– relevant and appropriate**	40 CFR § 761.61(a)(5)(i)(B)
	Shall be disposed of in accordance with the provisions for Cleanup wastes at 40 CFR 761.61(a)(5)(v)(A).	Bulk PCB remediation waste which has been de-watered and with a PCB concentration < 50 ppm – **relevant and appropriate**	40 CFR § 761.61(a)(5)(i)(B)(2)*(ii)*
Disposal of bulk PCB remediation waste off-site (self-implementing option)	Shall be disposed of: • in a hazardous waste landfill permitted by EPA under §3004 of RCRA; • in a hazardous waste landfill permitted by a State authorized under §3006 of RCRA; or in a PCB disposal facility approved under 40 CFR 761.60.	Bulk PCB remediation waste which has been de-watered and with a PCB concentration ≥ 50 ppm – **relevant and appropriate**	40 CFR § 761.61(a)(5)(i)(B)(2)*(iii)*

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Performance-based disposal of PCB remediation waste	Shall dispose by one of the following methods: • in a high-temperature incinerator approved under 40 CFR 761.70(b); • by an alternate disposal method approved under 40 CFR 761.60(e); • in a chemical waste landfill approved under 40 CFR 761.75; • in a facility with a coordinated approval issued under 40 CFR 761.77; or • through decontamination in accordance with 40 CFR 761.79. *NOTE*: On-site TSCA chemical waste landfill that complies with the ARARs identified in this table in the signed ROD would be considered an approved landfill.	Disposal of non-liquid PCB remediation waste (as defined in 40 CFR 761.3) – **relevant and appropriate**	40 CFR § 761.61(b)(2) 40 CFR § 761.61(b)(2)(i) 40 CFR § 761.61(b)(2)(ii)
	Shall be disposed according to 40 CFR 761.60(a) or (e), or decontaminate in accordance with 40 CFR 761.79.	Disposal of liquid PCB remediation waste – **relevant and appropriate**	40 CFR § 761.61(b)(1)
Risk-based disposal of PCB remediation waste	May sample, cleanup or dispose of PCB remediation waste in a manner other than prescribed in 40 CFR 761.61(a) or (b) or store remediation waste in a manner other than prescribed in 40 CFR § 761.65 if application approved in writing by EPA Regional Administrator and EPA finds that the method will not pose an unreasonable risk of injury to [sic] human health or the environment. Each application must include information described in 40 CFR § 761.61(a)(3). *NOTE*: Appropriate information required in an application can be provided in a CERCLA document (e.g. FS, PP, or ROD) that is approved or issued by EPA.	Disposal of PCB remediation waste – **relevant and appropriate**	40 CFR § 761.61(c)

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Disposal of PCB contaminated porous surfaces (self-implementing)	Shall be disposed on-site or off-site as bulk PCB remediation waste according to 40 C.F.R. § 761.61(a)(5)(i) or decontaminated for use according to 40 C.F.R. § 761.79(b)(4).	PCB remediation waste porous surfaces (as defined in 40 C.F.R. § 761.3) – **relevant and appropriate**	40 C.F.R. § 761.61(a)(5)(iii)
Disposal of PCB contaminated non-porous surfaces (Self-implementing option)	Shall be cleaned on-site or off-site to levels in 40 CFR 761.61(a)(4)(ii) using: • decontamination procedures under 40 CFR 761.79; • technologies approved under 40 CFR 761.60(e); or risk-based procedures/technologies under 40 CFR 761.61(c).	PCB remediation waste *non-porous surfaces* (as defined in 40 CFR 761.3) **– relevant and appropriate**	40 CFR § 761.61(a)(5)(ii)(A)(*1*)-(*3*)
Disposal liquid PCB remediation waste	Shall either: • Decontaminate the waste to the levels specified in 40 C.F.R. § 761.79(b)(1) or (2); or • Dispose of the waste in accordance with 40 C.F.R. § 761.61(b) or a risk-based approval under 40 C.F.R. § 761.61(c).	Liquid PCB remediation waste (as defined in 40 C.F.R. § 761.3) – **relevant and appropriate**	40 C.F.R. § 761.61(a)(5)(iv)(A) 40 C.F.R. § 761.61(a)(5)(iv)(B)
Disposal of PCB cleanup wastes (e.g., PPE, rags, non-liquid cleaning materials) (Self-implementing option)	Shall be disposed of either: • In a facility permitted, licensed, or registered by a State to manage municipal solid waste under 40 C.F.R § 258 or non-municipal, nonhazardous waste subject to 40 C.R.R.§§ 257.5 through 257.30; or • In an RCRA Subtitle C landfill permitted by a State to accept PCB waste; or • In an approved PCB disposal facility; or • Through decontamination under 40 C.F.R. § 761.79(b) or (c).	Generation of non-liquid PCBs at any concentration during and from the cleanup of PCB remediation waste – **relevant and appropriate**	40 C.F.R. § 761.61(a)(5)(v)(A)(1)-(4)
Disposal of PCB cleaning solvents, abrasives, and equipment (self-implementing option)	May be reused after decontamination in accordance with 40 C.F.R. §761.79; or For liquids, disposed in accordance with 40 C.F.R. § 761.60(a).	Generation of PCB wastes from the cleanup of PCB remediation waste – **relevant and appropriate**	40 C.F.R. § 761.61(a)(5)(v)(B) 40 C.F.R. § 761.60(b)(1)(i)(B)

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Performance-based disposal of PCB remediation waste	Shall dispose by one of the following methods:	Disposal of non-liquid PCB remediation waste (as defined in 40 C.F.R. § 761.3) – **relevant and appropriate**	40 C.F.R. § 761.61(b)(2)
	• In a high-temperature incinerator approved under 40 C.F.R. § 761.70(b); • By an alternate disposal method approved under 40 C.F.R. § 761.60(e); • In a chemical waste landfill approved under 40 C.F.R. § 761.75; • In a facility with a coordinated approval issued under 40 C.F.R. § 761.77; or		40 C.F.R. § 761.61(b)(2)(i)
	• Through decontamination in accordance with 40 C.F.R. § 761.79.		40 C.F.R. § 761.61(b)(2)(ii)
	Shall be disposed according to 40 C.F.R. § 761.60(a) or (e), or decontaminated in accordance with 40 C.F.R. § 761.79.	Disposal of liquid PCB remediation waste – **relevant and appropriate**	40 C.F.R. § 761.61(b)(1)
Risk-based disposal of PCB remediation waste	May dispose of in a manner other than prescribed in 40 C.F.R. § 761.61(a) or (b) if approved in writing by USEPA and method will not pose an unreasonable risk of injury to human health or the environment. NOTE: USEPA Approval of alternative disposal method will be obtained by approval of the CERCLA document (e.g., ROD)	Disposal of PCB remediation waste – **relevant and appropriate**	40 C.F.R. § 761.61(c)

Action	Requirements	Prerequisite	Citation
PCB Decontamination/Cleanup/Cover Design and Containment of PCB Contaminated Soil			
Decontamination of PCB-contaminated water	For discharge to a treatment works as defined in 40 C.F.R. § 503.9 (aa), or discharge to navigable waters, meet standard of < 3 parts per billion PCBs; or	Water containing PCBs regulated for disposal – **applicable**	40 C.F.R. § 761.79(b)(1)(ii)
	For unrestricted use, meet standard of 0.5 parts per billion PCBs.		40 C.F.R. § 761.79(b)(1)(iii)

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Decontamination of movable equipment contaminated by PCBs (self-implementing option)	May decontaminate by: • swabbing surfaces that have contacted PCBs with a solvent; • a double wash/rinse as defined in 40 CFR 761.360-378; or • another applicable decontamination procedure under 40 CFR § 761.79.	Movable equipment contaminated by PCBs and used in storage areas, tools and sampling equipment **– relevant and appropriate**	40 CFR § 761.79(c)(2)
Cap requirements for PCB bulk remediation waste left in place	Must do so in accordance with 40 C.F.R. § 264.310(a) and ensure it complies with the permeability, sieve, liquid limit and plasticity index parameters in 40 C.F.R. § 761.75(b)(1)(ii) through (b)(1)(v).	Designing and constructing a cap for on-site disposal of PCB remediation waste – **relevant and appropriate**	40 C.F.R. § 761.61(a)(7)
	Must be of sufficient strength to maintain its effectiveness and integrity during the use of the cap surface which is exposed to the environment.		
	A cap may not be contaminated at a level greater than or equal to 1 ppm PCBs.		
	A cap of compacted soil shall have a minimum thickness of 15 cm (10 inches).		
	A concrete or asphalt cap shall have a minimum thickness of 15 cm (6 inches).		
	Repairs shall begin within 72 hours of discovery for any breaches which would impair the integrity of the cap.		
Landfill cover design and construction	Must cover the landfill or cell with a final cover designed and constructed to: • provide long–term minimization of migration of liquids through the closed landfill; • function with minimum maintenance; • promote drainage and minimize erosion or abrasion of the cover; • accommodate settling and subsidence so that the cover's integrity is maintained; and • have a permeability less than or equal to the permeability of any bottom-liner system or natural sub-soils present.	Closure of a RCRA hazardous waste management unit – **relevant and appropriate**	40 CFR § 264.310(a)(1)–(5)

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Disposal of PCB bulk product waste in a permitted Municipal Solid Waste or a Non Municipal - Non Hazardous Waste landfill	Any person may dispose of the following PCB bulk product waste in a facility permitted, licensed, or registered by a State as a municipal or non-municipal non-hazardous waste landfill: Plastics (such as plastic insulation from wire or cable; radio, television and computer casings; vehicle parts; or furniture laminates); preformed or molded rubber parts and components; applied dried paints, varnishes, waxes or other similar coatings or sealants; caulking; Galbestos; non-liquid building demolition debris; or non-liquid PCB bulk product waste from the shredding of automobiles or household appliances from which PCB small capacitors have been removed (shredder fluff).	On-site disposal of PCB bulk product waste – **applicable**	40 C.F.R. § 761.62(b)(1)(i)
Cap drainage design, construction and maintenance requirements for PCB bulk product waste left in place in capped areas	Owners and Operators of all facilities must design, construct and maintain: (1) A run-on control system to prevent flow onto the active and/or closed portions of the landfill during the peak discharge from a 25-year storm; (2) A run-off control system from the active and/or closed portions of the landfill to collect and control at least the water volume resulting from a 24-hour, 25-year storm. (3) On-site drainage structures to carry incident precipitation from the disposal site so as to minimize the generation of leachate, erosion and sedimentation.	Construction of a RCRA Subtitle D landfill; drainage specifications – **relevant and appropriate**	ADEM Admin. Code r. 335-13-4-.17 (1)-(3) 40 C.F.R. 264.301(g)-(h)

Cap requirements for Bulk PCB product waste left in place (Final caps for UWDA and T-11 area)	The requirements for closure of existing and proposed landfill units shall include the following unless otherwise noted. (b) A final cover system must be installed which is designed to minimize infiltration and erosion. The final cover system must be comprised of an erosion layer(s) underlain by an infiltration layer(s) as follows: (1) The infiltration layer for MSWLF and ILF must be comprised of a minimum of 18 inches of earthen material and/or a synthetic layer that has a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1 x 10-5 cm/sec, whichever is less. (c) Final soil cover shall be graded so that: (1) Surface water does not pond over the landfill unit. (2) The maximum final grade of the final cover system shall not exceed 25 percent or as specified by the Department to minimize erosion. (3) Slopes longer than 25 feet shall require horizontal terraces, of sufficient width for equipment operation, for every 20 feet rise in elevation or utilize other erosion control measures approved by the Department. (4) The minimum final grade of the final cover system shall not be less than 5 percent or as specified by the Department to minimize ponding. (d) A vegetative or some other appropriate cover must be established to minimize erosion and, when applicable, maximum evapotranspiration. Within 90 days after completion of final grading requirements on each phase the owner or operator shall prepare the final cover for the establishment of a vegetative cover or alternative cover. Deep rooted vegetation (roots that may grow below 6-inch erosion layer) shall be prohibited as vegetative cover. Preparation of a vegetative cover shall include, but not be limited to, the following: (1) Placement of appropriate species of grass seed, fertilizer and mulch; and (2) Watering and maintenance necessary such that germination of grass will occur.	Final closure requirements for a MSW or Industrial landfill **– relevant and appropriate**	ADEM Admin. Code r. 335-13-4.20 (2)(b)-(d)

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Maintenance and protection of capped areas	The requirements for the Post-Closure care include the following. The owner or operator must conduct post-closure care following closure of the landfill unit. Post-closure care must be conducted for a minimum of 30 years, except as provided under 335-13-4.20(3)(b), and consist of at least the following: (1) Eroded areas shall be filled with suitable soil cover, compacted, graded and appropriate cover established as described in 335-13-4-.20(2)(d). (2) Areas which provide for ponding of surface water shall be filled, graded and an appropriate cover established as described in 335-13-4-.20(2)(d). (3) Landfilled areas with extensive surface cracks in soil cover shall be corrected as necessary, or as determined by the Department, to prevent infiltration of surface water. (4) An appropriate cover shall be maintained on the facility at all times as described in 335-13-4-.20(2)(d). (5) Access control structures shall be maintained or erected and signs shall be posted stating that the facility is closed. (d) Post-closure use of the property used for the disposal operation must never be allowed to disturb the integrity of the final cover, liner(s), or any other component of the containment system, or the function of the monitoring systems necessary to comply with the requirements of these Rules.	Post-Closure care requirements after final closure of a landfill**– relevant and appropriate**	ADEM Admin. Code r. 335-13-4.20 (3)(a)(1)-(5) ADEM Admin. Code r. 335-13-4.20 (3)(d)
Prevent unauthorized access	The owner or operator of the facility must control public access and prevent unauthorized vehicular traffic and illegal dumping of wastes by using artificial barriers, natural barriers, or both, as appropriate to protect human health and the environment.	Final closure of a landfill – **relevant and appropriate**	ADEM Admin. Code r. 335-13-4-.19

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Transportation of Wastes			
Transportation of hazardous waste *on-site*	The generator manifesting requirements of 40 C.F.R. §§ 262.20-262.32(b) do not apply. Generator or transporter must comply with the requirements set forth in 40 C.F.R. §§ 263.30 and 263.31 in the event of a discharge of hazardous waste on a private or public right-of-way.	Transportation of hazardous wastes on a public or private right-of-way within or along the border of contiguous property under the control of the same person, even if such contiguous property is divided by a public or private right-of-way – **applicable**	40 C.F.R. § 262.20(f)
Transportation of hazardous waste *off-site*	Must comply with the generator requirements of 40 C.F.R. §§ 262.20-23 for manifesting, § 262.30 for packaging, § 262.31 for labeling, § 262.32 for marking, § 262.33 for placarding, §§ 262.40 and 262.41(a) for record keeping requirements, and § 262.12 to obtain USEPA ID number.	Preparation and initiation of shipment of hazardous waste off-site – **applicable**	40 C.F.R. § 262.10(h)
Transportation of PCB wastes *off-site*	Must comply with the manifesting provisions at 40 C.F.R. §§ 761.207 through 761.218.	Relinquishment of control over PCB wastes by transporting or offering for transport – **applicable**	40 C.F.R.§ 761.207(a)
Transportation of hazardous materials	Shall be subject to and must comply with all applicable provisions of the HMTA and DOT HMR at 49 C.F.R. §§ 171-180 related to marking, labeling, placarding, packaging, emergency response, etc.	Any person who, under contract with a department or agency of the federal government, transports "in commerce," or causes to be transported or shipped, a hazardous material – **applicable**	49 C.F.R. § 171.1(b) and (c)
Management of samples (i.e., contaminated soils and wastewaters)	Are not subject to any requirements of 40 CFR Parts 261 through 268 or 270 when: • The sample is being transported to a laboratory for the purpose of testing; • The sample is being transported back to the sample collector after testing; and • The sample collector ships samples to a laboratory in compliance with U.S.DOT, U.S. Postal Service, or any other applicable shipping requirements, including packing the sample so that it does not leak, spill or vaporize from its packaging.	Generation of samples of hazardous waste for purpose of conducting testing to determine its characteristics or composition – **applicable**	40 CFR § 261.4(d)(1)(i) and (ii) 40 CFR § 261.4(d)(2)

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Land Use Restrictions/Institutional Controls			
Deed restrictions for closed landfills	(2) Closure. The requirements for closure of existing and proposed landfill units shall include the following unless otherwise noted. (i) Within 90 days after permit expiration, revocation or when final closure requirements in 335-13-4-.20 are achieved as determined by the Department, the permittee or owner of a facility shall record a notation onto the land deed containing the property utilized for disposal, and/or some other legal instrument that is normally examined during a title search, that will in perpetuity, notify any potential purchaser of the property that: 1. The land has been used as a solid waste disposal facility landfill unit; 2. Its use is restricted by the items contained in 335-13-4-.20(3)(c) and 335- 13-4-.20(3)(d); 3. The locations and dimensions of the landfill unit with respect to permanently surveyed benchmarks and section corners shall be on a plat prepared and sealed by a land surveyor; 4. Contain a note, prominently displayed, which states the name of the Permittee or operating agency, the type of landfill unit and the beginning and closure dates of the disposal activity. 5. Certification by an Engineer or Land Surveyor that all closure requirements have been completed as determined necessary by the Department.	Closure of Industrial Waste Landfill – **relevant and appropriate**	ADEM Admin. Code r. 335-13-4.20 (2)(i)(1)-(5)

Table 13-3
Action-Specific ARARs and TBCs
OU-1/OU-2 Record of Decision
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Deed restrictions for caps, fences and low occupancy areas	Must maintain the cap or fence, in perpetuity.	Use of a cap or fence at PCB remediation waste cleanup site - **applicable**	40 C.F.R. 761.61(a)(8)
	Within 60 days of completion of the cleanup activity the owner shall record, in accordance with State law, a notification on the deed to the property, or on some other instrument which is normally examined during a title search, that will in perpetuity notify any potential purchaser of the property:		40 C.F.R. 761.61(a)(8)(i)(A)
	- that the land has been used for PCB remediation waste disposal and is restricted to use as a low occupancy area as defined in 40 C.F.R. 761.3.		40 C.F.R. 761.61(a)(8)(i)(A)(1)
	- of the existence of the fence or cap and the requirements to maintain the fence or cap.		40 C.F.R. 761.61(a)(8)(i)(A)(2)
	- the applicable cleanup levels at the site, inside the fence, and/or under the cap.		40 C.F.R. 761.61(a)(8)(i)(A)(3)
	May remove a fence or cap after conducting additional cleanup activities and achieving levels specified in 40 C.F.R. 761.61(a)(4) which do not require a fence or cap and remove the notice on the deed no earlier than 30 days after achieving these levels.		40 C.F.R. 761.61(a)(8)(ii)

[1] ADEM Admin. Code r. 335-3-4-.02(1) and (2) were held unconstitutional for being unduly vague (335-3-4-.02(1)) and too restrictive (335-3-4-.02(2)). See Ross Neeley Express, Inc. v. Ala. Dep't of Envtl. Mgmt., 437 So.2d 82 (Ala. 1983).
[2] See supra n.1.

ADEM: Alabama Department of Environmental Management
ARAR: applicable or relevant and appropriate requirement
BMP: best management practices
CBMMP: Construction Best Management Practices Plan
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
CMBST: high temperature organic destruction (combustion); 40 C.F.R. 268.42; Table 1
C.F.R.: Code of Federal Regulations
CWA: Clean Water Act
DEACT: deactivation 40 C.F.R. 268.42; Table 1
NPDES: National Pollutant Discharge Elimination System
OSWER: Office of Solid Waste and Emergency Response
PCB: polychlorinated biphenyl
POLYM: polymerization; 40 C.F.R. 268.42; Table 1
POTW: publicly owned treatment works
PPE: personal protective equipment
ppm: parts per million
RCRA: Resource Conservation and Recovery Act of 1976
RORGS: recovery of organics; 40 C.F.R. 268.42; Table 1

DOT: US Department of Transportation
> : greater than
< : less than
≥ : greater than or equal to
≤ : less than or equal to
HMR: Hazardous Materials Regulations
HMTA: Hazardous Materials Transportation Act
LDR: Land Disposal Restrictions; 40 C.F.R. Part 268
TBC: To be considered
TSCA: Toxic Substances Control Act of 1976
US: United States
USEPA: United States Environmental Protection Agency
UTS: Universal Treatment Standards